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Aided by Code Book Paper Conditions Improve

The Filing of Prices Has Been Effective in Stabilizing Prices and Has Been An Important Factor in Bettering the Situation—Outlook for 1935 is Encouraging and From Present Indications Operations Will Be Greatly Accelerated by Early Fall

Written Specially for the Annual Number of the Paper Trade Journal

Conditions in the book paper industry for 1934 showed somewhat of an improvement over the conditions existing for several years previous. The trade, however, continued to suffer quite severely from the continuance of the depression and economic conditions that have been experienced for several years. On the whole, however, the industry, operating under the Paper Industry Code, which was approved by President Roosevelt in November 1933, has tended to stabilize conditions that have no doubt been a great improvement over the conditions existing prior to the Code operation.

Price Filing Great Stabilizer

The filing of prices, as required by the Paper Industry Code, has no doubt been the great stabilizer of the price structure. This price filing is not to be construed as price fixing. Any concern operating under the Paper Code is at liberty to file with any division a price on any grade they manufacture. So long as the price is not below cost, any manufacturer has a right to file a lower price if it is not below the costs of that particular manufacturer.

Demoralized Condition Remedied

If any manufacturer, for some reason or other, may have higher costs than would enable him to meet the price filed by a competitor, he is at liberty to file the same price to meet the price of his competitor. There is no doubt in the minds of a large majority of the manufacturers of book paper that this price stabilization has been of great benefit to the industry and done away to a very large extent the severe cut-throat demoralized condition that existed before the adoption of the paper industry code.

Prices Steady

Prices have remained very steady. The Book Paper Code provides that prices may be quoted only in three months periods, but there has been no advance from the prices quoted for the first quarter of 1934.

Production Falls Slightly

The actual production in paper in tons during the year 1934 was perhaps just a shade less than the tonnage produced in 1933, but the difference was hardly preceptible as to operating hours.

The cost of manufacture is steady to a great degree, but in the early part of the year, costs did very materially increase over the previous costs brought about by the advance in labor and the employment of additional manpower. The "staggering" of employees enabled a larger number of employees to be employed approximately forty hours per week.

No New Machines Installed

There were no new paper machines installed during the year and the tonnage produced was approximately 1,200,000 tons. The average operation of the industry was about 60 per cent of capacity, but because of slowing down in production generally, in order to give increased employment, the mills were operated at a larger percentage of machine time. As far as can be ascertained at the present time there are no new developments for the installation of additional paper machines for the manufacture of book paper.

Coated Paper Division

The Coated Paper Division, operating under the Book Paper Manufacturers Code, continues to be about the same in operation and production as the Uncoated Paper.

Outlook Much Brighter

The outlook for 1935 seems to be much brighter, and the tonnage booked for the month of January showed approximately 10 per cent or 15 per cent over the tonnage booked for January 1934.

The last quarter of 1934 showed a decrease over the tonnage booked for the last quarter of 1933, but this was no doubt due to the fact that in 1933 a great many mills were covered with low priced contracts expiring with that year, upon which speculative tonnage was ordered to some extent, whereas conditions at the end of 1934 differed as there was no contemplated advance in prices for the first quarter of 1935. Altogether, the outlook for 1935 is encouraging and from present indications the "optimist of the industry" feels that by the early fall the mills will probably be operating above 85 per cent.

Kraft Paper Industry Adjusts Manufacturing Operations to Overcome Over-Production

By S. M. Hudson, Secretary-Treasurer, Kraft Paper Association

Compared with other recent years, the year 1934 can on the whole be viewed with general satisfaction by the kraft paper industry. Such satisfaction does not arise because of favorable economic conditions under which the industry operated during the year, but rather because of the manner in which the industry adjusted its operations to meet what were very unsatisfactory economic conditions.

No industry which faced a demand for its product very little in excess of 50 per cent of its capacity to produce could claim that such a condition was favorable for profitable operation. Such a condition, however, did face the kraft paper industry and the record at the close of the year showed that the amount of new business written during the year was less than for any other year in the recent history of the industry.

This was caused partly by the general distressed condition of all industry, but more particularly because of the excessive speculative purchases of kraft paper by merchants and converters during the late summer and the early fall of 1933. These purchases resulted in an exceptionally large carryover of stocks in the hands of jobbers and converters and the influence of this carryover was felt throughout the industry during the first half of 1934.

Production Adjusted

The manufacturers of kraft recognizing these unfavorable conditions quite sensibly adjusted their production to the current demand for their product and as a result the production of kraft, although on a low level throughout the year, was free from excessive peaks or excessive valleys. The stocks of kraft on hand at the mills did not vary more than one week's supply from the high point to the low point during the year.

In previous periods of low demand, excessive stocks and excessive pressure to secure tonnage to fill up the mill have been the causes of a break in the market price. This year, however, by reason of this adjustment of the production of kraft paper to the demand for the product the market prices remained at a stable level throughout the entire year. This was a notable characteristic of the 1934 market and represents a condition which was not evidenced during any other recent year.

The price level, everything considered, was a fairly satisfactory one. It enabled many of the manufacturers in the industry to show credit balances on their operating statements for the first time in recent years. Other mills not quite so fortunate were able to reduce their previous losses. Such a record can be considered, therefore, as fairly satisfactory in view of the operation of the industry at a little over 50 per cent of its potential capacity.

Future Stability

During the year the industry took several steps looking towards its future stability, involving the study of the market for its product. There was evidence of an awakened interest in the importance of stability in the converting market and also of the importance of constructive trade practices affecting the distribution of kraft wrapping paper through the merchant.

The industry has united with the grocery bag manufacturing industry in establishing a joint committee representing the two industries. This committee is studying those problems which are common to both industries and is recommending to both the grocery bag converter and the kraft paper manufacturer a constructive and a cooperative program for their mutual benefit.

The industry has also appointed a committee which is studying the distribution of its product through the merchant. This committee in cooperation with similar committees from the other coarse paper divisions of the paper and pulp industry and from the Merchants Association, hopes to recommend marketing procedure which will be fair for both the manufacturer and the merchant.

Evidences of Progress

In many ways, therefore, the industry has come through 1934 with evidence of progress and of carefully planned adjustment to the economic conditions under which it operated. These evidences of stability and progress during the year were not unaccompanied, however, by serious problems, some of which yet remain unsolved.

Many of the problems which vexed the industry during the year were new ones arising out of the operation of the industry under the Code of Fair Competition.

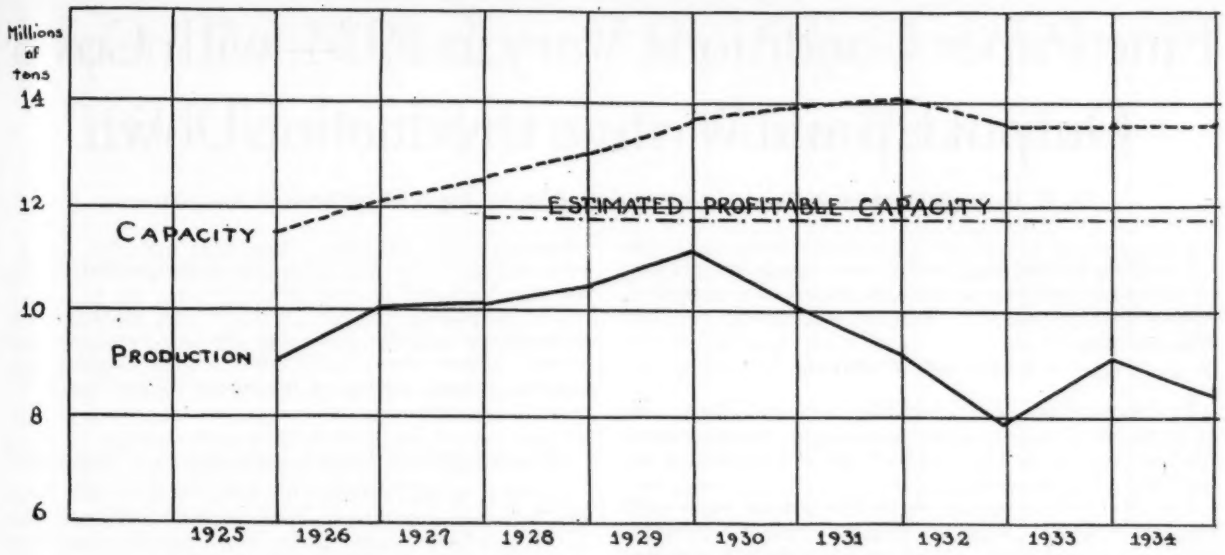
Minor Problems

At the beginning of the year it was generally believed by the manufacturers of kraft paper that the Code and particularly the open price plan would solve most of the minor vexing problems which had beset the industry in former years. During the early months of the year little difficulty was experienced, except for the presence in the market of some tonnage at low prices carried over from the period before the establishment of filed prices. The volume of this tonnage was not, however, excessive and the market absorbed the paper pretty generally before the middle of the year.

Toward the latter part of the year, however, operation under the open price plan of the Code began to develop new problems. Unfortunately a few members of the industry were taking unfair advantage of the protection afforded by the open price filings and by means of secret discounts or other unethical practices were selling paper at less than their current filed prices. They were thus able to secure for themselves a larger percentage of the available business of the industry than they would normally have received. The mills which refrained from indulging in these unfair competitive practices lost business because of their inability legally to meet these secret prices.

Price Filing Suspended

After several months of serious consideration of this problem, the Executive Authority on January 4, 1935, decided that it could best be solved by a suspension of the open price filing provisions of the Code, and such action was taken effective January 8. It was the belief of the Executive Authority that the major conditions of stability



ACTUAL PRODUCTION AND CAPACITY OF PAPER MACHINES IN THE UNITED STATES

1925—Production, 9,182,204 tons; capacity, 11,575,500 tons.
1926—Production, 10,000,000 tons; capacity, 12,000,000 tons.
1927—Production, 10,002,070 tons; capacity, 12,536,000 tons.
1928—Production, 10,403,338 tons; capacity, 13,027,930 tons.
1929—Production, 11,140,235 tons; capacity, 13,704,480 tons.
1930—Production, 10,169,140 tons; capacity, 13,900,000 tons.
1931—Production, 9,381,850 tons; capacity, 14,000,000 tons.
1932—Production—7,997,872 tons; capacity, 13,728,041 tons.
1933—Production, 9,190,017 tons; capacity, 13,728,041 tons.
1934—Production, 8,500,000 tons;* capacity, 13,728,041 tons.

* Estimated.

evidenced throughout the year 1934 could be maintained without the open price plan and that at the same time greater flexibility in the operation of the individual companies would be possible.

It seems reasonable to believe that the experiences of the industry throughout 1934 and the progress made toward stability will be manifest in a continuation of progress through 1935; and that the growing volume of new business now evident, if continued, will result in a satisfactory business year.

Aided by Operation of Codes Chemical Industry Makes Favorable Showing in 1934

By Guy A. Gardner, Manager, Chemical Division, M. Gottesman & Co., Inc.

The chemical industry in common with all other lines of business found 1934 to be a year full of serious problems, and many difficult adjustments of policy made necessary to meet the conditions of the various codes under which the industry must operate.

It was inevitable that many differences of opinion as to manner and method would develop during the time that the codes were under discussion but, on the whole, the industry cooperated splendidly with all the constructive ideas put forward by the Government.

Difficulties Being Ironed Out

That considerable benefit has resulted from the operation of the codes cannot be denied. As minor difficulties are gradually ironed out and a better understanding of the problems involved are arrived at, we may expect a still more favorable showing.

Business in paper makers chemicals maintained a steady tone throughout the year. Production and sales were appreciably larger than in 1933, particularly during the first six months of the year.

Prices were firm and slightly higher as a rule than during the previous year but there were no changes of consequence in any of the items most largely used by the paper and pulp manufacturers. Imported raw materials were naturally somewhat affected by the fluctuations in foreign exchange.

The steady course of the market gave the buyers confidence in existing price levels and as a result there was very little inducement offered for speculative buying. Contract prices were well maintained and consumers took delivery of requirements in satisfactory volume during most of the year.

Paper Mill Demand Improves

The demand from the paper and pulp manufacturers showed considerable improvement over a year ago and was kept at a satisfactory level throughout the year. Contract tonnage of such items as Salt Cake, Soda Ash and Chlorine moved in large volume. In fact the demand for Chlorine at one time during the year threatened to exceed the available supply.

The outlook for 1935 is decidedly favorable and it is generally believed that the improvement noted in 1934 will continue to increase during the coming year.

Fine Paper Conditions Vary in 1934, with Cover Output Up and Writing Production Down

By E. H. Naylor, Secretary-Treasurer, Writing and Cover Paper Manufacturers Associations

For 1934, writing paper production averaged 61 per cent of normal and shipments averaged 60 per cent of normal, representing 16 per cent decrease respectively over the 1933 average.

Cover Paper Production

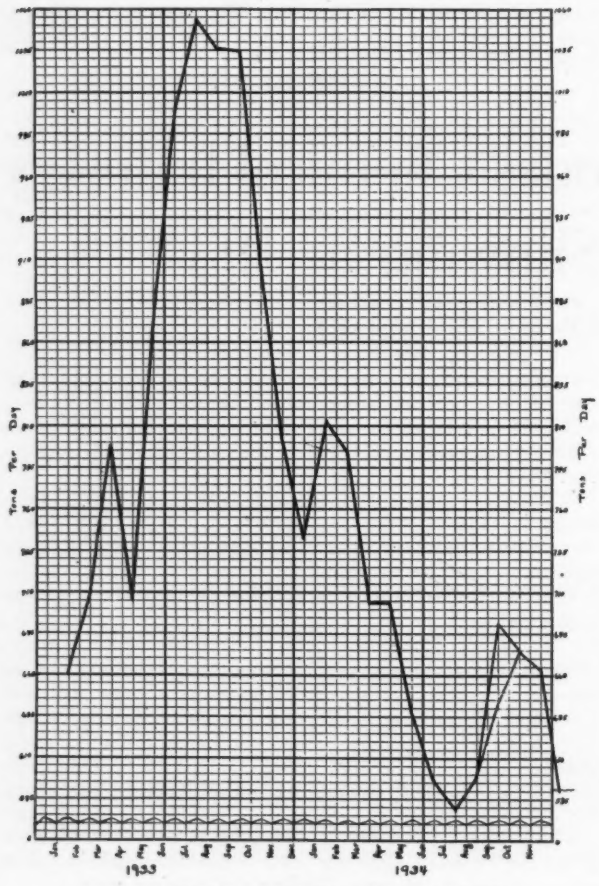
In cover paper, 1934 production averaged 52 per cent of normal and shipments averaged 50 per cent of normal, representing 24 per cent and 28 per cent increases respectively over the 1933 average.

The 1934 rate of operations for the writing paper mills was above the rate of production for such heavy industries as iron and steel, cement and construction, but was closely in line with the rate of operations for consumption industries to which the fine paper industry is definitely related.

Job Lots Carefully Handled

Job lots have been carefully handled by application for sale and distinction by label, and the excess stock situation, both on regular lines and job lots in the general market, has been very well cleared up.

The accompanying chart indicates the fluctuations in shipments of sulphite bond over the past two years, and present figures show that stocks of both sulphite bond and rag content papers in the hands of merchants and printers are below normal.



TOTAL SULPHITE SHIPMENTS. DAILY AVERAGE

Washington's Paper Industry on Upgrade

SEATTLE, Wash., February 16, 1935—With fifteen Western Washington pulp mills operating and with more than 5,000 employees sharing an estimated payroll of five million dollars, Washington's paper and pulp industry can be reported as definitely on the upgrade. Foreign dumping following England's abandonment of the gold standard in 1932 precipitated a general production dormancy which bordered on status quo. Operations and employment virtually were at a standstill. Such was the condition of the Western Washington pulp industry in 1932. Today, it is making an aggressive "comeback."

Abandonment of the gold standard in 1933 proved a welcome impetus to business and sales, operations and payrolls have expanded steadily to date. Practically all fifteen Western Washington pulp plants are understood to be operating at a profit.

In 1932, prime bleached pulp was quoted from $38 to $40 a ton. It is selling at $55 a ton today. And this spread is said to extend along other lines of pulp. It is not consistent that the rank and file of pulp manufacturers are among the strong critics of the federal gold policy. There are those among them, however, who are looking for stabilization that will protect their markets while removing money uncertainties.

A bright spot in the pulp industry means better times to other walks of business. Pulp mill operators point out that in addition to their own direct payrolls, they provide substantial employment to other fields. More than a million cords of wood is used annually in pulp production, thousands of forest workers and laborers are used to cut and transport this timber to mills. They are big users of chemical, machinery and supplies. The paper and pulp industry is, indeed, the hub of Washington industry.

Newfoundland Newsprint Production

Production of newsprint in Newfoundland during 1934 was somewhat larger than in the preceding year, according to a recent report from Consul General Harold B. Quarton, St. John's, although the percentage of gain is not on a level with that of Canada. The mill at Grand Falls reports a total production of 140,326 tons of paper during 1934, of which 193,792 tons went to the United Kingdom and 534 tons were sold locally. No information is available as to production by the mill at Corner Brook, but exports for the first 11 months were reported to have reached 137,969 tons as against 145,300 tons for the calendar year 1933. Approximately three-fourths of the 1934 shipments went to the United States, with the remainder divided between the United Kingdom and Argentina.

Paper Board Industry Re-Adjusted During 1934 Under Recovery Code Provisions

By Grafton Whiting, Statistician, National Paperboard Association

Paper is ranked as seventh among the major industries in the United States. Paper board is the largest subdivision of the paper industry, both in tonnage made and dollar value of sales. It is produced in all sections of the country and is supplied to many fabricators as a base material for their output.

Folding cartons, set up boxes, corrugated and solid fiber shipping containers are made from paper board as the best and most economical material to hold and protect commodities in the many steps taken from the initial manufacture to the hands of the ultimate consumer.

When consideration is given to the wide field in which cartons and containers are used, it will be found that the output of paper board is an indicator, exceptionally sensitive, to the activity of all except the heavy industries.

Comprehensive statistical information has been compiled by the National Paper Board Association and its predecessor associations which permits comparison of operations month by month and with prior years. A survey of the entire industry, both members and non-members of the association, is taken each year, so that the industry as a whole can be included in the statements made.

During the year 1934 there was a capacity to produce 85 per cent more output than was actually made. Furthermore, there are many mills not listed as strictly within the industry whose equipment is such that competitive grades can be produced and in fact were made in varying quantities during the year.

Over capacity is not a new factor in any industry, but the existence of many mills able to enter the paper board field whenever their regular demand is insufficient, introduces a condition of uncertainty difficult to contend with.

Seasonal Variations

The customers' demand for boxes of all kinds varies month by month with the production of goods to be packed. Each manufacturer must foresee his requirement and place orders in advance to cover his needs. Orders for paper board are scheduled by fabricators of cartons and containers even further in advance to allow sufficient time for the mill to supply the board.

Paper board is made to customer's specification which varies to such an extent that it is impractical to run stock ahead in anticipation of orders. For this reason production of the mills anticipates the seasonal trend of customer's demand.

Periods of greatest activity occur in the months of March and October in preparation for the Spring trade, and for the Fall and Christmas demand.

The accompanying chart displays the seasonal trend for the industry based on five years performance, 1928 to 1932, inclusive. The year 1933 has been excluded because of the abnormal activity during the Summer months, which would have tended to give a false ratio of activity in the month of July. There is also shown on the chart, the activity for 1934 in contrast with the five year average and it is of interest to note that although the activity for 1934 as a whole was 60 per cent or 11 per cent below the five year figure the trend except during April and May, follow closely the customary changes.

With the seasonal trend as a guide and a general knowledge of business conditions, a forecast of paper board demand can be made. It is true that in any one month such as April last year, an excess may occur but this will correct itself in the succeeding period. If the activity is treated as a budget with the gains or losses carried cumulatively, the per cent of variance will be found to be very small.

Inch-Hours

Activity in paper board mills is expressed in "inch hours" and actual performance is contrasted with a possible full time operation of 24 hours a day for six days a week. An "inch hour" is one inch of the machine's drier width for one hour. Thus a machine measuring 100 inches has a rating of 14,400 inch hours in one week of six days (100 x 24 x 6). The figures thus developed provide a means of comparison between wide and narrow machines and give a relationship for statistical purposes.

A paper machine is capable of running continuously except for delays necessary in cleaning and washing, and some mills make a practice of full time running on one or more of their machines. Under such conditions the activity for 1934 stated above at 60 per cent—based on six days; would be 51 per cent—based on seven days.

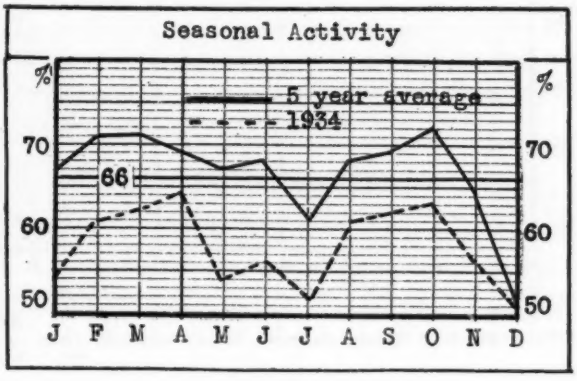
The chart entitled "Inch hours" shows the activity during the past three years on the six day basis. The out of season activity in 1933 during the Summer months is clearly indicated by the rise to over 85 per cent in July. The output proved to be so far in excess of requirements that the usual Fall increase failed to materialize. In fact a new record low made for the month of October was registered.

Orders and Production

Orders and production are stated in tons in the statistical reporting. The tons made per inch hour, while varying between one plant and another, do not change greatly year by year. In general the volume of output follows the degree of inch hour activity.

By establishing a rated capacity in tons for all mills, the orders received and the tons produced, can be expressed in percentage of capacity.

The chart entitled "Orders—Production" is based upon these percentages for each month during 1932 to 1934. Where orders received are in excess of production the area



between the chart lines is in white, whereas the area is black when production is greater than the incoming orders.

The usual experience shows that at the opening of each year orders advance beyond production with the upturn in demand. Again in the August-September period, a like trend is found. In 1933 due to the conditions thus prevailing, both orders and production ran contrary to any previous experience. In 1934 the year opened with the usual upturn but the late Summer demand did not develop into as large a volume as usual, indicating that buyers had become more cautious in their commitments.

The total production of all grades of paper board for the three years 1932 to 1934 was as follows:

1932	3,223,800 tons
1933	3,798,300
1934	3,700,000 *

* Estimated.

The final figures for 1934 are not yet available from all sources. There has been added to the figures already reported an estimate to cover the balance of the industry.

Days to Run

The term "days to run" is used to denote the number of days at normal operation that are required to fill all orders on hand. The accompanying chart shows the changes by months from 1932-1934 and also gives the yearly averages.

It is the practice in operating a mill to join together all orders calling for the same grades into a run schedule for the paper machine. In fact, the economy of operation is dependent largely upon the ability to make such combinations. A bank of orders calling for but four to five days of running is not sufficient, in view of the many grades called for to permit satisfactory planning. Each day added to the bank of unfilled orders increases the economy of mill operation, but to procure this customers must anticipate their requirements further in advance—a condition which obtains only when business confidence is had and the volume of orders is sufficient to insure operating at a normal rate of activity.

Prices

The prices of paper board are dependent on the demand, what customers are willing to pay, and the raw materials, labor and other expense entering into the costs of the product. The raw material most commonly used in producing paper board is waste paper stock. This is sorted and supplied in several grades through dealers who make a business of collecting the stock. The grade representing the greatest volume is classified as "Mixed Papers," and has a current market value. The prices in the West range higher than those in the East due to local conditions and the quality observed in the sorting. The Western prices are available in monthly averages from 1932 to 1934 and are shown in the accompanying table.

MIXED PAPERS *

Price Per Ton—Chicago, Ill.

	1932	1933	1934
January	$6.00	$7.00	$3.00
February	6.00	7.00	10.00
March	7.00	7.00	8.00
April	6.00	8.00	8.00
May	5.00	8.00	8.00
June	5.00	10.00	7.00
July	4.00	16.00	5.00
August	4.00	18.00	5.00
September	5.00	16.00	7.00
October	6.00	14.00	7.00
November	7.00	8.00	7.00
December	6.00	8.00	6.00

* From Official Board Market, 228 North LaSalle Street, Chicago, Ill.

The prices in 1932 ranged from $4.00 to $7.00 with an average of $5.50 per ton. In 1933 a shortage occurred in the Summer months due to the out of season demand already noted. The price of Mixed Papers advanced from $8.00 in May to $18.00 in August, in the attempt to encourage collection of a volume sufficient to satisfy requirements. In November the price was back to $8.00 at which figure it remained with one exception until June 1934. The average price in 1933 was $10.70 and in 1934 was $7.00.

There are many grades of paper board on the market ranging from $30.00 per ton upwards. Each has its price movement, but for the most part, differentials are recognized based on cost factors. One of the boxboard grades commonly used is Single Manila Lined Chip, and average monthly prices are available for No. 90 or heavier board as follows:

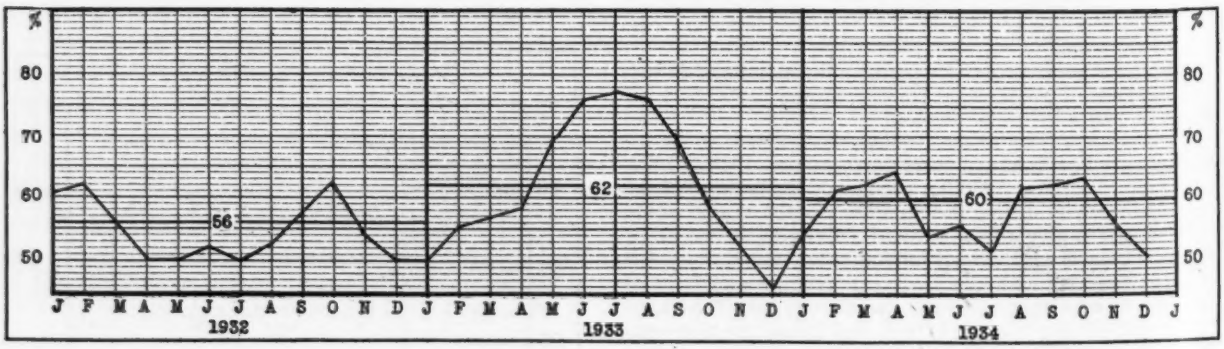
SINGLE MANILA LINED CHIP *

	1932	1933	1934
January	$37.50	$37.50	$55.00
February	37.50	37.50	55.00
March	37.50	37.50	55.00
April	39.00	38.50	55.00
May	37.50	38.50	55.00
June	35.00	38.50	60.00
July	35.00	50.00	50.00
August	37.50	52.50	50.00
September	37.50	55.00	50.00
October	37.50	55.00	50.00
November	37.50	55.00	50.00
December	37.50	55.00	50.00

* From Official Board Market, 228 North LaSalle Street, Chicago, Ill.

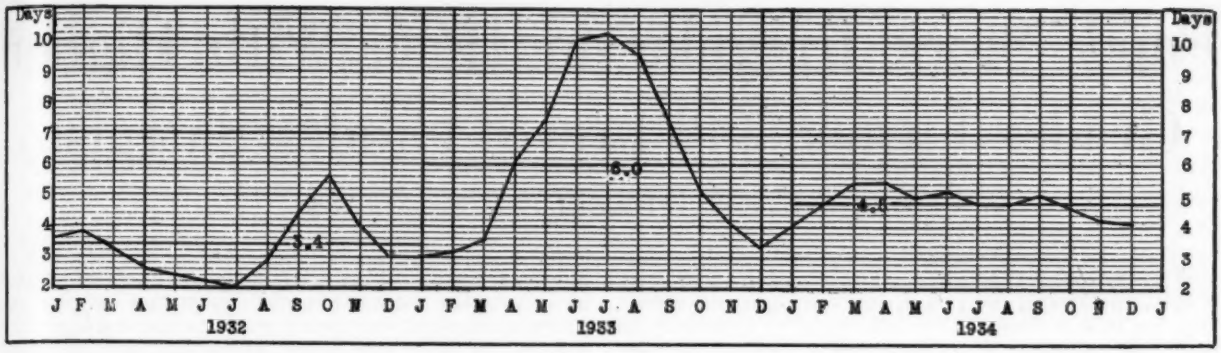
The average price in 1932 was $37.50 per ton. This same level of price continued until the middle of 1933 when a sharp advance carried it to $55.00. It remained at this figure until the middle of 1934 when a drop brought the price to $50.00 which held for the balance of the year.

The advance in the Summer of 1933 was a direct reflection of the increased demand at that time and the higher costs of production. The labor costs under the NRA together with higher cost for most of the expense items and the marked increase in raw materials prices made necessary a sales price sufficient to cover these changes.



INCH—HOURS

Basis: Rated time is 144 hours per week. Actual running time divided by the rated gives percentage—here consolidated by month. Width of the last drier is used to weigh machine report.



DAYS TO RUN.

Basis: The average tons produced in 24 hours constitute the rated capacity. Unfilled orders divided by rated capacity give days to run.

The conversion cost in a paper mill increases rapidly as the activity declines. This is due to the fact that the overhead or fixed charges are such a large proportion of costs. At the close of 1933 and the first of 1934 activity was at a low ebb with a consequent heavier cost burden on the mills. The maintenance of price levels during this period avoided serious losses. With the adjustment of raw material prices and better operating conditions in the latter part of the year, the reduction in price at that time was made possible.

A Period of Readjustment

The year 1934 was a period of readjusment during which operations under the labor provisions of the Paper Board Code and the effects of prices under the many codes governing raw materials and suppliers of all kinds from whom the mills make purchases, had to be assimilated. The low average activity required that every economy in operation be practiced. Many mills have been improving their equipment and processing to obtain greater efficiency and would have gone further had it not been for the high cost of making such changes.

Steam and power represent nearly one-third of the cost in board making. Developments in high pressure steam and turbo generators have made possible reduction in this large item cost, and this part of the equipment has been and is in the process of revamping in many mills.

Study of Quality Being Made

A close study of the quality of board is being made. It is found that increase in speed, i. e., tons per hour, to obtain a lesser cost tends to produce a board of poorer quality and that it is necessary to improve the formation of the sheet. This leads back to the preparatory equipment, the furnish and treatment in the beater room.

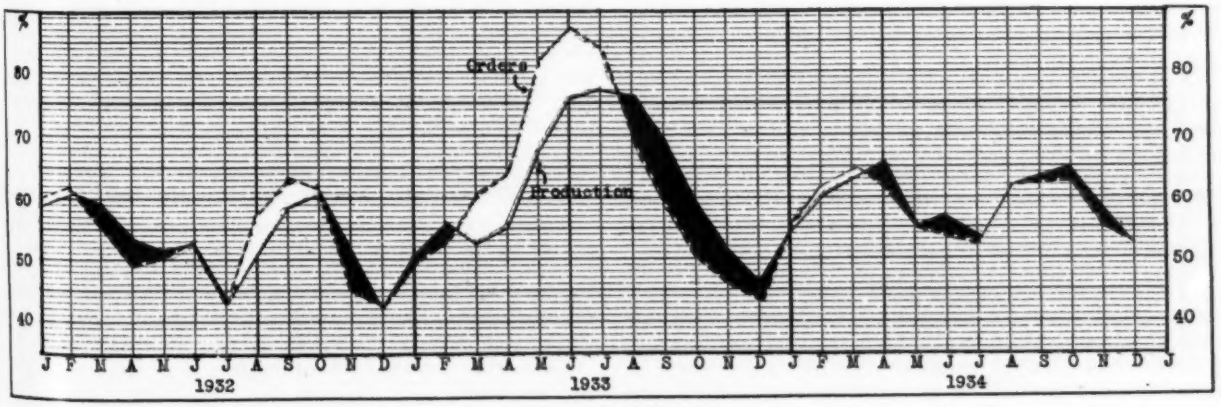
Strong Competitive Conditions to Be Met

Such studies are nothing new, but are being entered into at this time, because it is found that there are strong competitive conditions to be met in selling the standard grades of board, whereas preference can be had where it is demonstrated that a high quality of board is supplied. Many users of cartons or containers buy chiefly on a price basis, but others producing the better grades of merchandise are influenced by quality. Once a mill has satisfied such a user, it is found that future orders will be specified for the same source of supply.

Outlook for 1935

The outlook for 1935 is encouraging, particularly for the first quarter of the year. Inventories in the hands of the manufacturers are low. This is also true of their customers, the wholesalers and retailers, where cautious buying has been the rule during the past few months. Already in January of this year improvement in the demand over a like period of a year ago is noted, and mill activity is picking up to meet requirements. It is anticipated that the remainder of the year will follow the customary seasonal trends, but at a higher level than in 1934.

There have been so many false starts to lift business out of the depression that it seems reasonable to predict that past experience will prevent a repetition of a sudden overproduction and subsequent readjustment, and bring about an orderly and sustained betterment.



ORDERS — PRODUCTION

Basis: Orders booked and production made are divided by rated capacity and expressed in percentage. White area represents orders in excess of production; black area the reverse.

Paper Stock Irregular in 1934, With Higher Grades Firmer and Lower Grades Sluggish

By Walter R. Hicks, of Daniel M. Hicks, Inc., New York

We stand on the threshold of a new year. The door is ajar, symbolizing the jars of the year departed. Business has been a series of jars bearing labels from A.A.A. to X.Y.Z.—all antidotes of depression and elixirs of prosperity, with John Q. Public holding his nose and taking it reluctantly or thumbing his nose defiantly and wondering whether the prevention was worth the cure. In this state of recovery the specialists tell us the patient is doing as well as can be expected and we ask ourselves is it a New Deal, a misdeal or just an ordeal?

The Human Element

The trade as a whole is in sympathy with the administration and will do all it can to further better business. To date, however, the efforts have not been completely successful and many are discouraged. The difference between theory and practice is the human element—and that's the difference. The National Recovery Act presaged the millennium, but it developed into a "Fool's Paradise"; with everybody walking on the grass with utter abandon. This Garden of Eden became a tanglewood choking the blossoms of recovery, but as Autumn closed in upon us we found more leaves turning to gold and the few remaining red ones, of a lighter hue.

Nothing from nothing leaves nothing—that's depression. Add something to nothing and you've "got something." The translating of that "something" into purchasing power is prosperity.

The problem is "Are good government and good business compatible?" Is it possible to have one without the other, or in order to have one must we sacrifice the other? The present administration is trying to synchronize government and business into a harmonious existence. That it has not succeeded one hundred per cent is evident, but it was never expected to.

Its degree of success can best be measured by each industry as to how government control has functioned as applies to each particular industry. It is safe to say, however, that all business is better and that many would show a greater improvement had not certain obstacles, either of their own making or from the outside, been strewn in the path of progress.

As it applies to paper stock the resultant benefits that should have followed in the wake of improved business were not forthcoming, due to certain factors that forestalled the natural price advances. The two leading fibers in the paper manufacturing industry are cotton and wood. The one in its relationship with rags and the other with wood pulp and waste paper. Staple cotton was high and the textile mills consumed a goodly quantity which brought a heavy production of cuttings on the market, but the paper mill consumption was not sufficient to absorb these cuttings and a surplus resulted. This brought a fluctuation about at certain periods of the year. The high price of cotton made it possible to break up a quantity of these cuttings for textile and stuffing, but the tonnage was not sufficient to keep prices on a high level. The export demand was a big factor in keeping new cuttings from going lower, particularly the white grades, as there was a market abroad that could take care of about all they could get at a price. The old rag market was on the whole quiet over the entire year, as the roofing mills and the fiber mills only bought moderately, and as roofing goes so goes the old rag market.

Agreed Prices

There was an agreed price on bleached and unbleached sulphite, which pretty well stabilized the pulp market, but there were resale lots that permitted considerable buying at lower prices. This resulted in a hold off policy on the part of the mills and the market was draggy, with the mills covering against requirements.

These agreed prices seemed to benefit the higher grades of waste paper, for such grades as hard white, soft white and kraft and manilla cuttings were in good demand and maintained good prices over the year. Hard white sold at over the minimum price of bleached sulphite all year and white blank news brought more than ground wood during most of the same period. Book stock was very sluggish and seemed to follow in the wake of news and mixed papers. The packer wanted minimum prices on both these grades, which after they were established resulted in the old malady of supply exceeding demand and the prices became more minimum than minimum. The result is that minimum prices are not longer in effect. It is hoped that these grades will assume a better position in the market, which would tend to move all the low grades including book stock, ledger and kraft.

Better Rag Record

In summation, the market as regards rags was in a much better state than that of waste paper. In tonnage waste paper runs heavy and the advantage gained by the higher grades was more than offset. The policy of the rag packer, what ever it is, seems to be conducted along saner lines than those of the waste paper dealer. Is it that the rag man is a better merchant than the waste paper man, and that he is not subjected to the methods of the latter? The waste paper packer should control waste paper and not be the victim of it. They should put the industry on the basis of intelligent competition and fair practice, and until this is done in wide measure throughout the trade they cannot expect to enjoy the confidence and cooperation of the mills.

Wisconsin Paper Mills Optimistic

Employment gains and encouraging prospects were reported by the paper mills and converting plants at Wausau, Brokaw, Schofield and Rothschild, Wis., according to a survey made by the Wausau Chamber of Commerce. The average increase in the number of workers for the year ending January 15, 1935 was 25 per cent. Payrolls increased more than $17,000 in the first two weeks of January this year.

Answers to questionnaires were all optimistic. Some reported they are much better than last year, and others said they were good.

Newsprint Paper Manufacturing Industry Stages Remarkable Recovery During 1934

By C. L. Sibley, Regular Correspondent of the PAPER TRADE JOURNAL

Measured by volume of output, there is not a single industry in Canada which has staged such a remarkable comeback as that staged by the newsprint manufacturing industry during the past year. Finishing the last quarter of the year with a production close to 240,000 tons per month, it brought production for the calendar year to a total which reached an all-time record for any year in the history of the industry, with the single exception of the boom year of 1929, and came within 129,000 tons of reaching even that record. The total production for the year at 2,599,292 tons was 28.9 per cent more than in 1933—a truly remarkable showing. The following table supplies comparisons with previous years:

Newsprint Production in Canada

Year	Tons
1924	1,350,000
1925	1,522,200
1926	1,881,700
1927	2,086,900
1928	2,381,100
1929	2,728,800
1930	2,500,000
1931	2,221,500
1932	1,907,600
1933	2,017,000
1934	2,599,292

Vagaries of Exchange

While the upturn of output in the newsprint industry has exceeded the anticipations of the most optimistic, there has not been a commensurate improvement from a financial point of view. Not only have wages and other costs of production increased, but for a greater part of the year there was a decline of nearly $1.50 a ton in the net return to the operator in this country, due to the vagaries of exchange. At one time the premium on American funds constituted an important source of revenue to the Canadian manufacturer, as much as $8 per ton being netted on converting American dollar payments into Canadian funds. In August, 1933, there was an average loss of around 25 cents in converting American dollars into Canadian dollars for each ton of newsprint sold. During the present year this increased to a loss of $1.25 a ton on the conversion of currency, so that the income per ton in 1934 was lessened by some $1.50 per ton on this account.

The volume of newsprint exported during the year amounted to 2,399,624 tons, as compared with 1,838,104 tons in 1933, and the value was $82,078,659, as compared with $69,200,515. These figures indicate that while the tonnage rose nearly 30 per cent over 1933, the total value showed an increase only to the extent of about 19 per cent. This value was further reduced by the fact that the American dollar instead of being at a premium was at a discount.

Returns of the Dominion Bureau of Statistics, which are now made for the fiscal year instead of for the calendar year, show that for the nine months ending December last exports of pulp were somewhat less in volume than for the similar period of the previous year, while the total value was somewhat higher. The figures were 9,105,903 cwt., valued at $19,015,931 for the nine months to December last, as compared with 9,899,235 cwt., valued at $18,673,468 for the similar period of 1933. Bleached sulphite pulp at $10,718,557 formed the larger part of the pulp exports, while unbleached sulphite totaled in value $2,481,315, sulphate $3,148,337, and mechanical wood pulp $2,278,426. The remainder was made up of other kinds of wood pulp and wood pulp screenings.

Bombshells in Newsprint Camp

While the remarkable increase in production, steadily maintained from month to month, was a source of gratification to all, the most outstanding developments of the year centered around the efforts to secure such an increase in price as would allow of a reasonable profit on operations. It is claimed that taking all factors into account, including the discount on American funds, very few companies made any real profit, and many have actually been producing at a loss. This situation aroused the active concern of the provincial governments, and especially those in which the majority of the newsprint mills in this country are situated, namely Quebec and Ontario, the premiers of which protested strongly against the forest wealth of their provinces being exploited at a loss. Both set their faces against any further lowering of wages; in fact, they insisted on previous wage cuts being restored.

Faced with the double pressure of increasing costs on the one hand, and the financial needs of their companies on the other, executives made determined efforts throughout the year to get the various companies to sink their long-standing differences and come to a common agreement as to price. Towards the latter part of the year it looked as though this effort would be successful. An organization known as the Newsprint Export Association of Canada was the medium through which these efforts were made. In September it was announced that L. G. Belnap, who, as president of the Consolidated Paper Corporation, accepted the chairmanship of the association on its formation on the understanding that a permanent appointment would be made as soon as possible, had been replaced by a permanent executive, Charles A. M. Vining, who would devote his whole time to the work.

A Break In Prices

Negotiations looking to an agreement for an increased price seemed to be working smoothly when a bombshell was thrown into the camp by the announcement that one of the companies had fixed its price for newsprint with large American publishers for the whole of 1935 at the existing level of $40 per ton. Another bombshell followed immediately in the shape of an announcement by Premier Taschereau of Quebec protesting against such a contract at "the existing ruinous level," declaring that "increasing costs and the increasing needs of our workmen have made imperative a moderate increase in the price of newsprint," and winding up with the threat that any company which so ignored the common good as to make contracts for 1935 at $40 per ton would be punished by the withdrawal of all aid from the Government in the shape of special reductions in stumpage rates and other concessions. Premier Hepburn, of Ontario, followed with a statement in which he expressed himself as in hearty accord with Premier Taschereau.

Conference after conference followed, and at length

leading executives in the industry, with Premier Taschereau at their head, went to Ottawa and asked the Dominion Government to apply the provisions of the Natural Products Marketing Act and prohibit the export of newsprint sold at a price under an agreed level. Premier Bennett seemed sympathetic, but from what can be gathered appeared to have advised the companies to make another effort to straighten out the matter among themselves. In a later speeech he expressed a somewhat cynical amusement at industrial corporations bringing about such a chaos in their business that they had to come to the Dominion Government to interfere in their affairs and settle their quarrels.

In the end practically all the newsprint companies in the Dominion, with the exception of the one which had committed itself in regard to contract price, arrived at an agreement to increase the price of newsprint for 1935 by $2.50 a ton for the first six months and a further $2.50 per ton for the last six months of 1935. Furthermore, it was announced that the Quebec Government had implemented its threat to withdraw all privileges and concessions from the company which had precipitated the crisis.

Another Sensation Sprung

When it looked as though the matter had been settled on a more or less satisfactory basis, another sensation was sprung by the discovery that another company in Quebec would still be selling newsprint at lower than $42.50 per ton. This arose from the fact that this company had taken over contracts for the supply of newsprint to American publishers at less than $40 per ton, and had been supplying newsprint during 1934 at this cut price. The company, following the agreement, had raised its price $2.50 per ton, but that still left it supplying newsprint at a cut price. The Provincial Government threatened this company with withdrawal of all privileges and concessions unless it confirmed to a standard price. Negotiations followed, but what finally happened was not made public.

The net result of it all is that the matter has been patched up, but not finally settled. The consumers of newsprint are being called upon by practically all the producers to pay $2.50 a ton more for their newsprint for the current year. Whether this ends the matter or not, and whether or not a further increase of $2.50 a ton will go into effect on July 1 next, are subjects upon which your correspondent declines to prognosticate. He has seen too many surprises in the newsprint industry to attempt anything so foolish.

Reversion to Old Price

As a matter of fact, there is grave doubt as to whether the newsprint producers will collect a single extra dollar per ton for their product this year. Late in January it was announced that for the next few months at least producers would allow a discount of $2.50 per ton from the official price of $42.50, bringing the actual price to $40 per ton, or to the same level which prevailed during 1934. This follows the actual delivery of newsprint in January at $40 per ton by the one newsprint company whose action in the closing months of 1934 in signing 1935 contracts for the maintenance of that price precipitated the crisis. According to the practice of the industry all contracts are in some measure dependent upon the action of other companies. Several companies undertake to provide their customers with newsprint at the lowest price quoted by any company with a capacity of 100,000 tons of newsprint per annum. The company in question has a capacity in excess of this minimum. Others draw contracts undertaking to meet the price in any community, and others will make this minimum applicable to all customers. By this interlocking of contracts the whole industry finds itself involved with the minimum price in the market.

Following upon his definite announcement of a reversion to the 1934 price schedule, Premier Taschereau made a statement in the Quebec Legislature that as the newsprint companies had failed to reach an amicable agreement in their negotiations for stabilization of the price of paper at a reasonable basis, he was obliged to declare that during the present session of the Legislature the Government would adopt legislative measures which will definitely solve this question. The Premier declined to amplify the statement, but indicated that vigorous action would soon be evident.

Meanwhile there has been some criticism on the part of publishers in respect to government interference in the matter of price. It has been argued that this is a matter which might more wisely be left to the newsprint companies and the publishers to work out among themselves. It was further suggested that if a number of mills were closed up entirely and production concentrated in the most efficient mills with a low burden of overhead, these to run at capacity, then there might be no reason for increasing the price.

As against this is the fact that there are many towns dotted all over Quebec and Ontario that were founded entirely for workers in the pulp and paper industry and which are wholly dependent on local pulp and paper mills. Closing up mills in these places would mean complete abandonment of these towns, with social and political results of a far-reaching nature—results which, in the end, it is believed in government circles, would be highly prejudicial to the newsprint industry and consequently to the publishing interests.

Canada's Most Important Manufacturing Industry

A report issued by the Dominion Bureau of Statistics showed that at the beginning of 1934 there were seventy mills in Canada manufacturing pulp and 67 mills making paper, newsprint making up 84 per cent of the total tonnage of paper manufactured. The total capital invested in the manufacturing part of the pulp and paper industry, counting only that invested in operating mills, was $599,265,544, a decrease of six per cent. compared with the previous year. The total number of employees was 24,037, and the yearly payroll around $26,500,000.

While the pulp and paper industry is still ranked as the most important manufacturing industry in Canada for gross and net value of manufactured products, as well as for the total number of employees and distribution of salaries and wages, the value of both its gross and net production steadily decreased from the peak year of 1929 up till the end of 1933. Whether or not this trend was reversed in 1934 will not be known until a detailed analysis has been made of the figures.

The gross value of the manufactured products in 1929 was $243,970,761. Thereafter there were sharp declines until in 1933 the gross production was valued at only $123,415,492. The net value of production in 1929 was $147,096,912, while for 1933 it was little more than half that amount, namely, $75,782,971. One consolation was that in 1933 the rate of decrease in net value, namely, 12.56, as compared with the previous year, showed a decided reduction, the decrease in the previous year having been 21.76 per cent. If operations in the woods are taken into consideration the total value to Canada of the industry as a whole in 1933 amounted to $125,081,525, a decrease of only nine per cent. from the previous year, as compared with a decrease of 33 per cent. in the previous year.

Pulpwood Production

The apparent total production of pulpwood in 1933 was 4,746,382 cords valued at $33,213,973, as compared with 4,222,224 cords in 1932, valued at $36,750,910, an increase in quantity but a decrease in value. Of the total production in 1933, about eighty-five per cent or 4,027,827 cords were manufactured into pulp in Canadian pulp-mills, while the remaining 15 per cent or 718,555 cords, valued at $4,696,459, was exported to the United States. The proportion of Canadian pulpwood exported in the raw or unmanufactured form increased from 1932 to 1933, but the actual quantity so exported shows an increase.

The total quantity of pulpwood used in Canadian mills has increased by 11 per cent during this period. There was a smaller importation of pulpwood into Canada in 1933 than in 1932, amounting to only 17,049 cords.

The total value of all materials going into the manufacture of pulp in 1933 was $35,864,381 and the total value of all pulp produced, including that made in combined pulp and paper mills for their own use was $64,114,074.

The total value of all materials used in the manufacture of paper in 1933 including the pulp made in combined establishments for their own use was $49,765,915; the total value of paper and miscellaneous paper products manufactured was $97,030,429.

Exports of Pulp and Paper

The exports of wood pulp from Canada during the calendar year 1933 amounted to 608,510 tons valued at $23,354,637 as compared to 452,293 tons in 1932, valued at $18,930,064, an increase of thirty-five per cent in quantity and twenty-three per cent in value. During 1933 the imports of wood-pulp were 5,706 tons, valued at $177,289, a decrease in quantity and value.

The exports of paper and paper goods during the calendar year 1933 were valued at $72,396,132 as compared with $86,323,539 in 1932. These exports were made up chiefly of newsprint paper of which 1,838,105 tons, valued at $69,200,515, were exported, chiefly to the United States. Canada's exports of newsprint are now second only to her exports of wheat and are greater than the newsprint exports of the rest of the world. The 1933 exports represent an increase in quantity and a decrease in total value from the 1,776,764 tons, valued at $82,966,199, which were exported in 1932. During 1933 the total value of paper and paper goods imported was $5,345,603, a decrease from the imports for 1932.

The gross contribution toward a favorable trade balance resulting from the activities of the pulp and paper industry as a whole in 1933 amounted to approximately $94,832,603, being made up of the difference between the value of pulpwood exported and pulpwood imported, amounting to $4,604,726, the difference between the value of pulp exported and pulp imported amounting to $23,177,348, and the difference in value between paper exports and imports amounting to $67,050,529. The total for 1932 was $102,559,435.

Rights of Paper Companies Safeguarded

A piece of legislation of the utmost importance to pulp and paper companies was adopted by the Quebec Legislature during the year. This was a bill providing for the automatic renewal of yearly leases for cutting rights in the forests held by pulp and paper companies. The passage of this bill was regarded as inaugurating a new era as far as harassed and unpaid bondholders of the various pulp and paper companies are concerned, as in future the companies are assured of cutting rights provided all obligations to the Government are met. Premier Taschereau, in supporting the bill before the Legislature, remarked. "Unless it has some guarantee of security, what company will build a pulp or paper mill in the province? The public would not buy the company's bonds or stocks unless the company had a guarantee. Can we possibly afford to make an exception in Quebec to a rule that applies in every other province?"

Lumber Industry on Road to Recovery

The lumber trade of Canada, which is so definitely allied with the pulp and paper industry, being in fact in the case of many companies a joint industry, may be said to have definitely established itself on the road to recovery during 1934, although there are local qualifications to this broad statement. There has been a general increase in the consumption of lumber throughout the country, in comparison with the past four years, when it seemed as though the bottom had fallen out of the business entirely. While the demand cannot be described as anywhere normal, a constant and steady improvement is noticeable, and if this progress is maintained, business may in the next year or two assume what may be considered normal proportions.

Increased demand from Great Britain, under the operation of the Ottawa Agreements, has been of invaluable benefit to the industry. This outlet has relieved much of the tension which would have been experienced in Eastern Canada through having to find a local market for the production of the mills. This applies largely to softwoods, but the increase in the hardwood lumber trade with Great Britain is also being steadily maintained.

In British Columbia the lumber export industry has continued to make phenomenal progress, a leading reason being the extent to which British Empire imports have been diverted to that province as a source of supply since the Imperial Conference at Ottawa. British Columbia now exports 50 per cent more lumber to the United Kingdom than does Eastern Canada although it is 6,000 miles farther away by ship and pays a higher wage scale.

Towards the betterment in the lumber trade the work of Trade Boards and Government departments has contributed. The Dominion Forest Products Laboratories, Quebec Forest Products Commission, Canadian Hardwood Bureau, White Pine Bureau and Canadian Lumbermen's Association have conducted excellent propaganda work. Also during recent months the Federation of Eastern Canadian Lumber Industries has been inaugurated. The members of this organization, which at present includes Quebec, Nova Scotia and New Brunswick, consider the export market with Great Britain now so valuable to the Dominion as to necessitate the appointment of a permanent trade commissioner whose headquarters will be in London, England. At a meeting held recently in Montreal, K. G. Fensom was named for the position, he having already undertaken similar work with successful results on behalf of the Canadian Hardwood Bureau. Ontario, it is anticipated, will eventually align itself with the other Eastern Provinces. British Columbia has for some years maintained a trade commissioner in the United Kingdom, and has found it decidedly beneficial to do so. The new Federation is proceeding cautiously and along sound lines. Among the items discussed as being of outstanding importance are standardization of grades, improvements in methods of manufacturing, and grade marking of lumber.

The impost of $4 per thousand feet on Canadian lumber entering the United States, and the retaliatory duty placed by the Canadian Government on lumber brought in from

the United States, have had the effect of eliminating a substantial volume of lumber trade between the two countries. It is, of course, a curious situation which these tariffs have created, and rather amusing in some respects. The obvious intent was to compel consumers to use more of the native woods of the two countries. For instance, Canada wanted to replace the high-class woods like oak, walnut, and mahogany, much of which entered via the United States, with birch and maple. Likewise the authorities in the United States wished their consumers to use more yellow pine or Douglas fir in preference to imported Canadian spruce and pine. The question now being asked is whether or not the means have justified the end. It is understood that negotiations are taking place on both sides with a view to arriving at a compromise, thereby enabling the lumber trade to proceed along its former natural channels in these particular species. Obviously if an agreement is concluded and the tariffs either adjusted or eliminated altogether, there is every possibility that many of the Canadian manufacturers who are exporting their pine, spruce and birch to Great Britain might find it advantageous again to divert their attention to doing business with the United States, in which case all the anxiety and effort as regards developing and maintaining Canada's export trade with the United Kingdom might be discounted.

Hydro-Electric Development Still Proceeds

Development of hydro-electric power is steadily proceeding in Canada, despite the fact that in some districts there is over-supply. At the beginning of 1934 the hydro-electric power available in the Dominion totaled 7,332,070 h.p. Approximately 217,000 h.p. was added during the year, bringing the total at the end of 1934 to over 7,500,000 h.p. Much of this added power consisted of large developments on the upper reaches of the St. Maurice river by the Shawinigan Water and Power Company.

In respect to consumption of electric power 1934 set a new all-time record. Latest available figures from the Dominion Bureau of Statistics show an increase of 21.2 per cent in the output from central stations as compared with the previous year, and an increase of 16 per cent as compared with 1930, the highest previous year on record. While part of this increase was due to the constantly increasing electrical equipment in homes, a substantial part was accounted for by new practical uses to which surplus power has been put.

One great factor in the solution of the problem of surplus power has been the use of electric steam generators to supply steam to industrial concerns, mainly pulp and paper mills, at costs competitive with those for steam generated by coal. As a result of this development Canada now has electric steam generator installations of over 1,500,000 h.p. Electric steam generators not only have potential application in pulp and paper mills, but in large departmental stores and other outlets which have a high connected daytime load, for supplying heating and process steam at nights, and on Sundays and holidays. It is believed that with a satisfactory off-peak rate for this service a considerable increase in the volume of such service will result. Another potential use for off-peak power is found in the generation of oxygen and hydrogen electrolytically from water. The process has already been proved to be commercially practicable, and awaits only the development of commercial products or industrial processes requiring one or both gases in quantity.

Among the prospective future load-builders is the lighting of highways, and in this connection the Shawinigan Water and Power Company has instituted an experimental installation on a half-mile stretch on a highway about three miles west of Three Rivers, Que. Drivers who have used this stretch attest to the value of the lighting as a safety factor in night driving. Another and close-related market is being found in the flood-lighting of sports fields of various sorts. The best example of this is an installation at the Maple Leaf Stadium in Toronto during the year. There 200 flood-lighting projectors deliver 25,000,000 combined beam candlepower. The average attendance at flood-light games during the season was about four times that of afternoon games, and the total attendance after flood-lights were installed was 100,000 greater than for the same period in the previous year. The great activity in mining, particularly in gold mining, is also providing a profitable market for hydro-electric power.

The Printing and Publishing Industry

The Dominion Bureau of Statistics has just released the principal statistics of the Printing and Publishing industry in Canada for 1933.

This industrial group includes publishers of newspapers and periodicals who do their own printing and are engaged wholly or chiefly in this work. Many of these establishments also do book-binding, lithographing, engraving and allied work as a side-line. This report does not cover printing and publishing done as a side line in establishments classed in other industrial groups.

There were 767 establishments engaged in the printing and publishing industry in 1933 as against 762 in 1932. The distribution by provinces was as follows: Ontario 294, Saskatchewan 125, Alberta 83, Manitoba 74, British Columbia 66, Quebec 68, Nova Scotia 30, New Brunswick 23, and Prince Edward Island 4.

Capital investment in these establishments decreased from $61,156,728 in 1932 to $58,217,041 in 1933. The value placed on lands, buildings, machinery, etc., was given at $44,827,715; materials on hand, stocks in process and miscellaneous supplies on hand amounted to $1,886,769; finished products on hand were valued at $269,098; and operating capital at $11,233,459.

The average number of employees in this industry was 15,961, of which 7,220 were paid on a salary basis and 8,741 were wage-earners. Salaries and wages paid in 1933 amounted to $21,474,968.

Cost of fuel totalled $259,170, a decrease of $14,932 from $274,102 reported in 1932. The power equipment of the industry consisted mostly of electric motors and totaled 23,873 h.p. The total expenditure for electricity was $436,432, representing the cost of 24,932,388 k.w.h.

The materials used cost $9,790,362, the greater part being spent for newsprint paper. The total value of all products of this group, including revenue from advertising, sales of publications and sums received for other products and work done amounted to $50,802,974.

The South as a Paper Making Center

Dr. James S. Thomas, president of Clarkson College, Potsdam, N. Y., returned last week from an extended tour of the industrial centers in the South and declared that the principal reason for the sudden prosperity and improvement in that section is the price of cotton. Relative to the paper industry he spoke of hearing a discussion at Washington regarding the manufacture of white paper in the South with the Reconstruction Finance Corporation contributing to the cost of erecting the mills. "Northern paper mill owners may well take due regard of the South as a papermaking center," he stated, "and there are large stands of pine in that region which can be used for production of paper. Eventually, the center of the industry will be located in the South instead of the North."

Year in Many Respects is Most Encouraging in Wood Pulp Industry Since 1929

By O. F. Swanson, Sales Mgr., J. Andersen & Co., and the Pulp and Paper Trading Co.

Retrospective reflections of 1934 upon the events in the wood pulp industry bring the realization that it made strenuous attempts to keep the pace set by its husky predecessor and, in certain respects, the results were quite satisfying. On the whole, it can be considered a more peaceful year but, on account of our having grown accustomed to several years of rather unsatisfactory business, it is possible that caution in regard to purchases and sales was carried beyond the point of necessity. Nothing startling occurred in any of the several branches of the industry, but some progress, mostly in reducing costs, was surely made, both in the manufacturing and sales divisions. The course of the markets for chemical wood pulp required by the paper, board and artificial silk industries was, in a way, remarkably uneventful throughout the entire year. Fair demand was experienced each month and price fluctuations were much less pronounced than for several years past. Problems of exchange and other economic factors were less difficult, and it is reasonable to assume that, in many respects, 1934 will be considered the most encouraging year since 1929 although, of course, as the year progressed, there were times when tendencies for uncertainty prevailed for short periods. Sometimes indications were in favor of an upward trend, and, then again, they pointed toward a weaker market.

No Break in Prices Until Fourth Quarter

However, the demand for both chemical and mechanical pulp was at all times sufficiently brisk to prevent any break in prices until the beginning of the fourth quarter, when kraft pulp suffered a decline of approximately $5.00 per ton. This price reduction spruced up the buying courage of several large users of this pulp to the extent that contracts for a substantial tonnage were closed for both prompt and forward deliveries. Although the cartel known as the Sulphite Pulp Suppliers—S.P.S., for short—terminated its price agreement for European markets, while keeping in operation its arrangement for curtailing production whenever the manufacturers deemed this advisable, the general price structure on pulp was never seriously threatened in this market. The various organizations, affiliated with the manufacture and distribution of both pulp and paper, should be given due credit for an important share of the efforts made to improve conditions by preventing a recurrence of the ruinous price-cutting campaigns frequently resorted to in the past, as well as for using every effort at their disposal to better conditions in general. These organizations are still functioning in the same old spirit of fullest cooperation with all concerned, for the benefit of the pulp and allied industries combined and, hence, in a way, for business in general. The fine service rendered by these associations has been, and still is, of immense value to the entire trade. This can also be said about the various and excellent trade papers, publishing records of new developments and supplying the trade, at large, with up-to-date data of what transpires in the industries of pulp, paper, board, chemical, waste paper, machine clothing, machinery and others, connected, in some way, either directly or indirectly, with producing necessities for the successful operations of these combined industries. These publications occupy a most important position in the trade, and it is doubtful that their true value is fully appreciated by any of us.

Improvement of Preceding Year Continued

The opening of the year inherited some improvements in certain respects from 1933 and this "Widow's Mite" was not only much needed and appreciated, but so tenderly and carefully guarded that it accumulated some interest during 1934. About the middle of the second quarter, definite improvements in the market of the better grades of unbleached sulphite occurred. This condition continued for a short period and the close of the summer months saw the market in these grades back again to the same level of demand as in other grades of chemical pulp. Following this minor flurry, the market settled down again to fairly steady business for the balance of the year and, while it was not exactly weak, it lost that little extra "pep" it had. Apparently, large accumulations of pulp on hand at consumers' mills, or in transit to them, had a depressing effect on conditions in general and, now and then, the market gave evidence of excessive offerings. Numerous resales of chemical pulp were reported during the third and fourth quarters. These came from several channels, and were probably made for the purpose of reducing inventories, and increasing cash balances toward the end of the year. Sales of this nature have always made buyers more cautious and, if the tonnage available is important enough, they eventually cause a general reduction in prices. This, however, did not happen in 1934.

Leading kraft pulp producers met in Stockholm and agreed upon a minimum price on kraft pulp for the entire year of 1935. It is hoped that, in the future, this agreement will tend, in a measure, to eliminate any disturbance of the kind that resales caused in the past.

1,900,000 Short Tons Produced

According to reports, the total imports of wood pulp into the United States during 1934 amounted to about 1,900,000 short tons, valued at approximately $62,000,000, which indicated a decrease of about 9 per cent in tonnage, and an increase of about 8 per cent in value, compared with the tonnage imported during 1933. Unquestionably, last year can claim the highest degree of stabilization in the wood pulp industry of any year during the last two decades. From a standpoint of profit, it fell below several years during this period, but should be on about an equal basis with 1933 in this respect.

Owing to the somewhat greater activity in the market, during the first half of the year, the profits of the industry during this period probably exceeded the profits of the last six months. The slight recession in the tonnage used, compared with the record-breaking total tonnage consumed during 1933, in the manufacture of commodities either wholly or partially made from wood pulp, were, in a measure, responsible for a slight reduction of estimated profits for the whole year. It is reasonable to assume that mechanical wood pulp suffered a greater decline in this respect than any chemical pulp because, with

the exception of 1932, the total imports of this pulp last year were reported the smallest of any year since 1922. In spite of the prolonged drought in northern countries, manufacturing ground wood, and the now-and-then apparent scarcity, no actual shortage occurred, nor did this situation seriously affect the prices on this continent. European paper and board manufacturers were more seriously concerned about this condition than American and Canadian buyers of this pulp. They were sometimes compelled to cover current requirements with spot buying at advanced prices when the pulp producers were unable to make deliveries under contracts, and claimed protection of the Force Majeure clause.

United States Largest Producer

As usual, United States led the world in the combined tonnage of pulp produced of all classes, of which about 85 per cent was used by the producers themselves, and the remaining 15 per cent disposed of in the open domestic and foreign markets. It is hoped that the total value of chemical and mechanical pulp produced here in 1934 will at least equal the figures of 1933, which was reported to be $135,326,674, according to the Census Bureau's biennial census for that year.

According to figures compiled, and reported by the U. S. Pulp Association, 88 per cent of all pulp mills in the United States, excluding the soda pulp mills, manufactured the most pulp in the second quarter, and the least, in the third quarter of the year. The average price on all grades of pulp combined, whether domestic or imported, for each quarter of the year, is in favor of the first quarter, but the difference is very slight and the year witnessed the most effective price stabilization experienced over a period of years, all of which contributed to the happiness—if such a thing exists—of the distributors.

Canada Makes Big Showing

Canada, as always, made a formidable showing in the business, both in tonnage, and quality of her pulp. The total exports for 1934 were virtually on a parity with exportations from this great pulp producing neighbor in 1933. There was a decline in tonnage, to be sure, but so slight that it was practically negligible. Canada ranks second to the United States, only in tonnage produced. Some of her grades of chemical pulp, especially bleached sulphite, for the manufacture of artificial silk, enjoys the highest reputation for excellent quality, both on this continent and abroad.

Sweden, true to tradition, was the largest supplier of pulp to the numerous so-called converting mills in the United States with a total tonnage of approximately 700,000 long tons of chemical pulp. Canada supplied about 480,000, Finland about 185,000, Norway about 84,000, and Germany, about 82,000 long tons. The combined importations from other countries was rather unimportant.

Full Bleached Kraft

The progress made last year in the manufacture of full bleached kraft, or sulphate pulp, is, in my opinion, the most noteworthy accomplishment in the pulp field. In order to obtain required qualities in certain grades of modern paper, this pulp has become a necessity and the tonnage required by the trade increased considerably last year. It is still a more expensive pulp than bleached sulphite, but this undesirable feature is being gradually eliminated.

Chlorinated Kraft

So-called chlorinated kraft and sulphite pulp appeared on the scene last year at slightly higher prices than quoted on the regular unbleached grades. This appears to be a step in the right direction. Unbleached sulphite, treated in the manner indicated by the name, does not turn pink in the beaters, and the color of such kraft pulp should make this grade more suitable for paper and board, where a light shade is one of the most important features.

Reference to sulphite pulp calls to mind the man who discovered, and perfected, the original process for manufacturing this pulp, Carl Daniel Ekman of the Bergvik Mills, Sweden. A granite monument, appropriately inscribed, was erected to his memory last year at Northfleet, England, and unveiled in the presence of a distinguished gathering of Britishers and representatives of other nationalities. Mr. Ekman made the first sulphite pulp at Bergvik, and is reported to have made the first paper from this pulp on a commercial scale at the Northfleet Paper Mills.

The employers of labor in the pulp industry experienced another peaceful year, and the position, at the present, in regard to the labor question of the future, is still without signs of disturbance.

Continued Improvement

It is difficult to offer a definite opinion as to the prospects of the pulp industry of the future as it depends upon the general conditions of the trade throughout the world, but if there is no unexpected and serious set-back it is reasonable to assume that the slow but steady improvement experienced during the past two years will continue. There is still room for considerable progress in both the technical and commercial sides of the industry, but I think that I may safely claim that we are heading in the right direction, and can therefore look forward to 1935 with hope and confidence. There is an old saying which, on account of its sound advice, is worth repeating:

"Each for All, and All for Each." If this advice could be followed to the letter a great deal of worries about the future would be eliminated.

Grays Harbor Co. Makes Rayon Pulp

Manufacture of rayon pulp is now well under way at the Grays Harbor Pulp and Paper Company plant in East Hoquiam, says the *Washingtonian,* of Hoquiam, Wash. Simultaneous with this news comes word that the recently completed new pulp unit of the factory went into production this week, adding one-third to the company's pulp output and payrolls and thereby giving to Hoquiam and Grays Harbor what is equivalent to a large new factory.

About 500 people were employed in the factory proper early last year. As the result of the new unit employe rolls of those engaged in pulp and paper making have been increased to about 650 people. These employment figures do not include wood cutters employed by pulp contractors or men engaged in construction work.

The new rayon pulp, being manufactured from hemlock, is being shipped to Japan, France, Belgium and to the east coast of the United States. It is being manufactured under secret processes, rights to which have been secured by the local company under longtime contracts.

Increased output and payrolls follow enlargements and repairs made at the big factory. These include the building of a new unit and the installation of a new digester. The factory unit now has a battery of four digesters.

The Grays Harbor Pulp and Paper Company is the largest manufacturing operation on Grays Harbor.

Paper Week in New York Is Big Success

F. J. Sensenbrenner, President of Kimberly-Clark Corp., Is Elected President of the American Paper and Pulp Association at Fifty-eighth Annual Convention at Waldorf-Astoria—Many Affiliated Organizations Hold Largely Attended Meetings

There was a record attendance at the Fifty-Eighth Annual Meeting of the American Paper and Pulp Association and affiliated organizations, which opened at the Waldorf Astoria, New York, last Monday, and continued the better part of the week. The Code of Fair Practice and other problems confronting the industry were freely discussed and, on the whole a spirit of optimism prevailed.

Election of Officers

The meeting of the Board of Governors and Executive Committee of the association was held on Thursday morning, when the following officers were elected to serve during the ensuing term:

President, F. J. Sensenbrenner, president, Kimberly-Clark Corporation, Neenah, Wis.

First Vice-President, Norman W. Wilson, Vice-President, Hammermill Paper Company, Erie, Pa.

Vice-President, S. L. Willson, President, American Writing Paper Company, Holyoke, Mass.

Vice-President, John R. Miller, Vice-President, West Virginia Pulp and Paper Company, 230 Park Avenue, New York.

Vice-President, Hugh J. Chisholm, President, Oxford Paper Company, 230 Park Avenue, New York.

Vice-President, Stuart B. Copeland, Vice-President, Eastern Manufacturing Company, Bangor, Maine.

Vice-President, H. W. Ellerson, President, Albemarle Paper Manufacturing Company, Richmond, Va.

Vice-President, D. C. Everest, Vice-President, Marathon Paper Mills Company, Rothschild, Wis.

Vice-President, A. R. Graustein, President, International Paper Company, New York.

Vice-President, John L. Riegel, Executive Vice-President, Riegel Paper Corporation, New York.

Vice-President, J. D. Zellerbach, Vice-President, Crown-Zellerbach Corporation, San Francisco, Cal.

Executive Secretary, Charles W. Boyce, 122 East 42nd street, New York.

Import Committee Report

During the meeting Warren B. Bullock, manager of the Import Committee of the American Paper Industry, presented the annual report of that organization, which ran as follows:

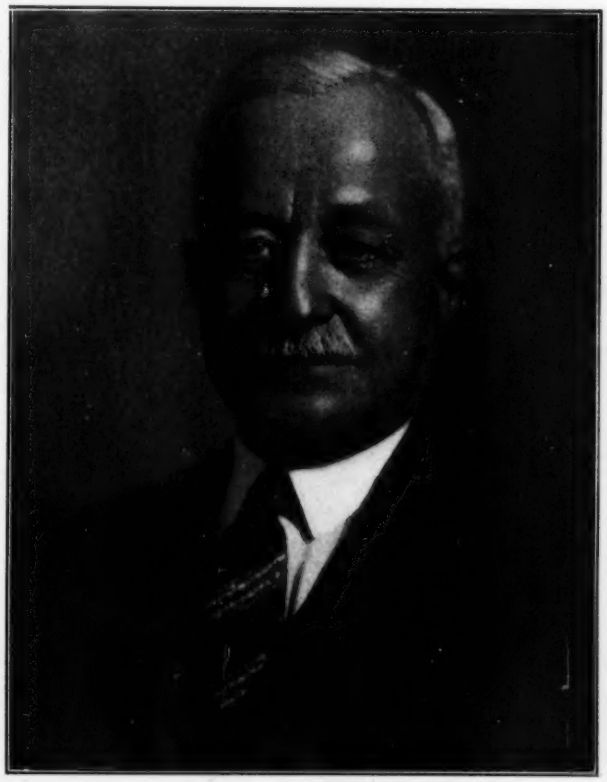
"The sweeping changes which present day legislation has brought to American business in general and to the Paper Industry in particular have been reflected in a material expansion of the functions of the Import Committee of the American Paper Industry. These changes have involved both additions to its previous responsibilities, and a changed relationship to the industry as a whole.

"Until about a year ago the sole responsibility of the Import Committee was the checking of unfair foreign competition. This was accomplished through constant scrutiny of imports and the invoking of existing tariff laws to prevent the misclassification, undervaluation or dumping of foreign papers.

"Under its new program, however, the Committee, without the slightest relaxation in its former activities, has been charged with important additional responsibilities. In one of these new fields the Import Committee is endeavoring to secure upward revision of certain duty rates in accordance with the provisions of the National Industrial Recovery Act.

"Still another added function has been its responsibility for the proper representation of the Paper Industry in the negotiation of reciprocal trade agreements with foreign nations. Here, the Import Committee's staff has been placed at the disposal of the Association's Committee on Public Affairs, in whose name all work has been done in connection with these trade agreements, commonly known as reciprocity treaties.

"This report, therefore, is in three sections, each detailing the extent and character of the work now being done in each of these three fields.



F. J. SENSENBRENNER, President

Traffic Law Enforcement

The Committee was established in the summer of 1924, following the adoption of resolutions at the convention of the American Paper and Pulp Association in the spring of that year, authorizing this new activity. The Committee began its work officially as of October 1, 1924. Since that time it has had a long and successful record of achievement for the Paper Industry.

"Despite the added duties, the work on the

original program has not been allowed to lag. The following table shows in concise form the result of the Import Committee's operation in this field:

Cases awaiting appropriate action, December 31, 1934	1,519
Cases tried, not yet decided by Customs Courts	86
Cases decided during the period, Oct. 1, 1933-Dec. 31, 1934	598
Cases WON during period Oct. 1, 1933-Dec. 31, 1934	520
Percentage of cases won during above period	86.9
Percentage of cases won from organization of Committee	79.5
Total cases recorded since organization of Committee	9,607
New Cases during period, Oct. 1, 1933-Dec. 31, 1934	1,206
Approximate value of paper involved in cases originating during the period of this report	$1,500,000.00

"The effect of these operations on the American Paper Industry has been far more than the amount of paper actually found to have been entered without payment of proper duties. These court cases have prevented the importation of other papers, and the value of paper sold by domestic mills but purchased abroad before the Import Committee began its work approximates about $5,000,000 a year.

"A single instance is that of one grade of book paper which was imported to a volume of $1,000,000 per year from a single foreign country before the Import Committee proved its misclassification. Total book paper shipments from all foreign countries are now less than ten per cent of the amount of this single item. The same is true of kraft wrapping which is still imported in large volume at low prices, but which was formerly a far greater item of import. In other words, the Import Committee has produced $50,000,000 in business in the ten years of its existence.

"While the Import Committee has acted during the period of this report on importations affecting practically every division of the American Paper and Pulp Association, there are some groups in which there have been particularly important problems, deserving special mention.

"Newsprint and Ground Wood Papers—A determined effort is under way to break down the old practice of classifying ground wood papers as dutiable papers, and regardless of the effect on the industry as a whole, the newspapers are assisting in these efforts. Although some 20,000 tons of canary news is used by tablet manufacturers and stationers the newspaper publishers are endeavoring to have such papers held to be standard newsprint, for the benefit of one small Pacific Coast user.

A decision that side runs 15¾ inches in width is standard newsprint duty free is being followed by efforts to import paper in 15½ inch and 15 inch rolls duty free for a limited number of newspapers, again despite the fact that thousands of tons of such paper is used for other purposes. Shipments of colored papers are being entered as standard newsprint, to be cut into sheets after importation and sold as poster paper.

"All of these efforts to break down the accepted newsprint definition are being contested vigorously by the Import Committee and this includes such papers as poster, novel and other similar papers just above the grade of standard newsprint.

"Wrapping Paper—The highest Customs Court has decided that Swedish kraft wrapping paper has been undervalued, and the collection of duty on a higher value approved. Despite this decision, the Treasury Department has decided that there is no dumping of this paper. As a result of the Court's action, the same steps will be taken to secure a decision that M. G. Sulphite wrapping paper is undervalued. A complaint of dumping of this paper is still pending in the Treasury Department.

"Book Paper—Growing competition in the book paper field is being experienced as a result of the higher prices at which domestic papers must be sold to meet the added costs imposed by the Recovery Act wage schedules. Finland and Norway are the particular sources of these papers, and a dumping complaint has been filed against the importations of Finnish book paper.

"The importance of the Import Committee as an agency constantly on the watch to prevent the development of unfair competition before the damage becomes severe can not be overestimated. The conditions resulting from the passage of the Recovery Act and the increased cost of production due to higher wages require particularly close attention, for the resultant higher prices have made the American market more attractive to the foreign mills.

"This is shown by the record of paper imports for 1933, and for 1934, when code costs were generally at an enforced higher level. By basic groups, the comparison in importations is as follows, and it will be noted that imports have increased, despite the adverse effect of America's abandonment of the gold standard:

	1933		1934	
	Pounds	Value	Pounds	Value
Standard News Print	3,587,082,000	$68,494,651	4,419,396,000	$76,271,527
Other Printing Paper	4,188,821	89,377	7,797,950	167,897
Greaseproof	617,625	82,649	346,231	78,232
Kraft Wrapping	8,317,553	275,566	8,052,950	297,909
Other Wrapping	1,746,249	65,663	1,602,658	59,417
Writing	1,606,957	273,443	1,635,370	359,524
Fancy Coated Paper	1,252,403	464,459	1,634,656	612,465
Fancy Paper Uncoated	26,124	7,961	26,718	10,091
Tissue Light Weight	1,131,665	450,705	1,091,594	534,790
Tissue Heavy Weight	439,367	164,003	507,263	224,457
Pulp Board in Rolls	12,580,717	218,375	18,184,482	317,627
Paper Board	13,682,817	229,692	15,594,084	269,854
Leather Board, etc.	11,899,775	368,768	7,219,306	239,952
Cigarette Paper	15,349,475	3,426,320	15,774,318	4,122,578
Hanging Paper	243,473	71,730	248,274	95,206

"This table shows increased importations in all but three of the grades listed.

Section 3 (e) of the Recovery Act

"One of the first of the new tasks devolving upon the Import Committee after the passage of the Recovery Act was the need for action under the foreign competition provisions of the Act to prevent the foreign producers taking advantage of higher prices in this market to expand their sales. Section 3(e) provides that the President may take steps to impose quotas, set higher rates of duty, or levy embargoes to prevent foreign competition from destroying the efficacy of the Codes operating under the Recovery Act.

"A special division was set up to handle complaints. It soon became apparent that there was no sympathy with any efforts of domestic industry to secure added protection. Voluminous questionnaires were required to be filled out by every company in a protesting industry. Whether intentional or not, the expressed intent of the Recovery Act to protect industries operating under the codes has not been carried out in practice.

"Relief was denied the newsprint industry when it proved that foreign newsprint was contracted to sell at $7 below any established North American price, with no explanation of the reason for such denial. Practically no other complaint by any industry under this section has as yet reached the President for decision, though many have been on file and under investigation for a year. The Paper Industry filed complaints where conditions demanded, but the demands of the Administration for voluminous statistics were almost impossible for compliance.

Reciprocal Trade Agreements

"When the Tariff Act of 1930 was being written, the Import Committee was called upon to serve as consultant to the Paper Industry in its efforts to secure such protection as would equalize foreign prices with American costs. Because of this experience in this field, the Import Committee has ben assigned the task of handling the reciprocal trade agreement problem on behalf of the Committee

on Public Affairs of the Paper Industry.

"Study of export markets, as well as its past experience in the Import field, was necessary to the proper presentation of the Industry's cause in the hearings on these treaties.

"The Cuban agreement involved export trade alone. The Paper Industry was able to secure such contacts in these negotiations that the treaty as finally signed involved reduced duties which have expanded American paper sales in Cuba.

"Following the Cuban trade agreement hearings, other hearings were scheduled on agreements with various Latin-American and European nations. In the case of Latin-America, the effort was devoted to removing restrictions on our export trade. These hearings involved proposed trade agreements with Brazil, Haiti, Colombia, Honduras, Guatemala, Salvador, Nicaragua and Costa Rica.

"The Industry placed on record its attitude and requirements in the case of each hearing. These, like all other proposed trade agreements, involve hearings before the Committee of Reciprocity Information, which takes the testimony of any interested industries as to their requirements, but no information is disclosed as to whether a given industry is scheduled for mention in the pending agreements.

"The first important hearing involving a European paper exporting nation was that on Sweden, when the Paper Industry was represented by several speakers, in addition to having filed extensive briefs. Similar action was taken as to the agreements with Belgium, and the Netherlands, and more recently that with Finland. The proposed agreements with Switzerland, Spain and Italy were of little importance to the Paper Industry.

"There is impending, however, a trade agreement with Canada, which will involve every grade of paper. Canada's rates on paper are higher against the United States than as against any other paper producing nation, despite the fact that her paper and pulp exports to the United States involve a major portion of her entire export trade. The Paper Industry will make an adequate presentation of its attitude when the hearing on the Canadian agreement is held March 18, next.

"In this, as in all other cases involving these reciprocal agreements, it has been the responsibility of the Import Committee to collaborate with every affected group in the paper industry and to prepare, or assist in preparing the briefs and oral presentations for these hearings. Without the long experience and available records of the Import Committee the Paper Industry would have found the necessary work in connection with these hearings an almost intolerable load to have been added to the details already burdening its Association executive staffs.

With the Import Committee's records and staff available, the work has been done with almost no additional expense, and so thoroughly that the Paper Industry has been complimented by other important industries as having made the most effective appearance at any of the hearings which have been held.

"In these cases, as in all other activities, the Import Committee's work has been to once more place the Paper Industry on record as asking only that scientific tariffs be levied, to give its mills an equal chance with foreign producers in their own markets. By such a program and policy, carried through from the Tariff Revision campaigns of 1922 and 1930, under the N.R.A., and the trade agreement hearings, the Industry holds its position unchanged so that its future action can be justified by its past policies.

General Conditions

"A change in the methods of financing the Import Committee went into effect when the Paper Industry Authority became fully organized. Prior to that date the Import Committee was financed by individual mill subscriptions. Now, it is financed through the budget of the Paper Industry Authority, and all divisions of the industry under that Authority are entitled to its services. Even with the added work assigned the Committee, its financial requirements have not been increased.

"The budget for the current year is the lowest in the ten years of its existence, with the exception of the single year ending September 30, 1933. The Import Committee's services are now at the call of over 500 paper mills, and thirty-odd divisions of the industry, instead of the 200 subscribers of its earlier days. Because of the attitude of the present administration on tariff problems the work of the Import Committee is more important to the Paper Industry than ever before."

CHARLES W. BOYCE, Secretary

Salesmen's Luncheon

There was a record attendance at the annual luncheon of the Salesmen's Association of the Paper Industry, held in the Grand Ball Room of the Waldorf Astoria, on Tuesday, when between six and seven hundred guests and members assembled. W. L. Raymond, retiring president of the association was a very efficient chairman.

Sidney L. Willson Speaks

Mr. Raymond introduced Sidney L. Willson retiring

president of the American Paper and Pulp Association, who was enthusiastically received, and spoke as follows:

"Mr. President and members of the Salesmen's Association: I do not profess to be an economist, but my business experience of fifty years or more has given me an opportunity to absorb some horse sense and to apply it to business problems. We have come through a period of distress. Distress compels us to think—and to think of the rights of others as well as our own. These conditions have brought the members of our Industry together—and the NRA and our codes have further developed a consciousness of the benefits of cooperative efforts. As a result—suspicion has been supplanted by confidence. Fear has been supplanted with courage, and prejudice has been supplanted with logic and common sense.

"During the past two years many governmental activities have been inaugurated—some excellent; some good—and some not so good. The Paper Industry is at present operating under codes. I believe there are no codes in existence from which better results have been obtained. None are perfect. Ours does not meet all the conditions—but they have certainly accomplished a great deal for the industry. It is my belief that where the codes have been found beneficial the provisions will be continued beyond the termination of the present Emergency Act, but even if terminated, I believe the benefits derived from compliance with the provisions of our code have been so thoroughly proven that a voluntary continuance of them would be endorsed by a large majority of the industry.

"As salesmen, I assume you are interested in having my views on future business conditions. Most forecasters are adepts in the art of making reservations. I am not a forecaster—but will give you some real facts upon which to predicate a future trend.

"The middle of 1932 was the nadir of the depression. Since then improvement has been shown—notwithstanding the occasional ups and downs that have occurred. 1933 was a better year than 1932 by about 15%—1934 showed a further improvement over 1933, so I can definitely state that general business conditions today throughout the country are better than the low point in 1932 by about 25%. Statistics for the paper business for the first six weeks of 1935 indicate a further upward trend—and my prediction is that the upward trend will continue. I am not depending upon artificial stimulants—nor pump priming—but upon natural causes—maybe a new type of industry—maybe that old law of supply and demand.

"I've talked about my fifty years' business experience—Let's cover that period and see what has happened, or even go it one decade better and take sixty years, which brings us back to the 70's. First let me make a general statement. When you stop to think what happens to knock out a depression or a semi-depression you will find some new commodity or industry has appeared on the scene or some existing commodity or activity has developed a greater consumptive demand which absorbed large numbers of the unemployed. My observation is that about every decade something pops up to help the situation. The even dates used hereafter are not exact, but illustrative of the point I wish to make. Going back to 1870 we find great expansion of the railroads; while in 1880 a broadening of the telegraph and telephone services. In 1890, it was the automobile—In 1900, the movies—In 1910, the radio—In 1920, the housing activity. In 1930—just at the beginning of the depression we were due for something new—probably aeroplane construction, but peace talk and disarmament discussions served to spike that activity temporarily. Maybe that will come into the picture soon, but if not we have air conditioning and television, or something else developed through scientific research to look forward to. Each of these new activities utilized existing facilities—and enlarged the production and consumption of many existing commodities, and reached out into many avenues of commerce, and absorbed the vast armies of the unemployed.

"Prosperity develops from natural causes such as the above—not from pump priming nor from artificial stimulants. We can't legislate prosperity, nor do I believe we have to worry about the alphabetical parade, because I think natural causes are now active, and are developing the results we all hope for.

"As an industry we need a little more. We need better prices for our commodities. While the NRA and the codes have done much for our Industry as a whole—every mill has suffered because the extra costs, through compliance with code provisions, have not been equalled by increases in prices. Illustrative of this—take the actual figures of one company—where raw materials, labor and supplies—covering the same tonnage have actually increased $480,580, while the increase in sales volume on equal tonnage, as compared between 1934 over 1933, amounted to $227,540—leaving as a net additional cost—$253,040, which depletes surplus to that extent.

"If you hear rumors of advancing prices—don't be surprised or alarmed—and my advice is, if advances are made, accept them cheerfully, unless you want to see a lot of mills closed, with a result of still higher prices.

"Inasmuch as my invitation suggested that my remarks be brief, I am going to draw to a close and become a little more personal. For six years I have been honored with the presidency of the American Paper and Pulp Association. You doubtless know I have resigned—because I feel I have served long enough and because other pressing matters make it desirable to do so.

"My contacts with the members of your organization—an important affiliated association of the American Paper and Pulp Association—have been most pleasant. I want to extend, in my official capacity for the last time, my cordial greetings, and to express the hope that your deliberations in the future may result in benefit to each and all the members of your association."

George H. Mead, of the Mead Corporation, First Vice-President of the American Paper and Pulp Association, and one of the most prominent members of the paper industry, was the next speaker. He declared that after twelve months spent in Washington he believed that a new understanding between Government and business was coming to pass. Mr. Mead paid a great tribute to the guest speaker, the Hon. John Dickinson, Assistant Secretary of Commerce. He said that the department of government most active and helpful in Washington was the Department of Commerce and that no one played so great a part as the assistant secretary, whose suggestions were universally constructive.

Hon. John Dickinson Speaks on Recovery Versus Demagoguery

When the chairman introduced Mr. Dickinson to the gathering, he was cheered to the echo. The subject of his address was "Recovery Versus Demagoguery." He spoke as follows:

"I am always glad to bring the greetings of the Administration at Washington to a group of business men who are meeting together to discuss the affairs of the industry in which they are engaged. In my opinion, no more important service has been performed by the recovery program than to stimulate and enable business men to come to grips with their common problems through common effort, and thus to set at work a process of self-education which

will enable them much better than in the past to play their part in bringing stability not merely into their own industry, but into the whole national economy.

"There are of course many things in the economic situation today with which business men are still dissatisfied. That dissatisfaction, if it is not to be a source of confusion and disturbance from which business men will be the greatest sufferers, must not be met in a spirit of emotionalism, but rather in one of understanding. We have passed through a great depression which has naturally disturbed our sense of balance. Like a man recovering from an illness and whose strength has not been completely reestablished, business today is still apt to think more of its ills than of its blessings.

"Accordingly, if we are to get a grip on ourselves and take a calm view of the situation, we must commence by frankly and honestly recognizing the enormous improvement which has been brought about since the zero hour of March 1933. I do not intend to enter upon any comparison between the then and the now, but simply to point out that in that interval, approximately four million people have been put back to work in private industry, that the national income has been increased by about five billion dollars; that business failures have been reduced to the low point since 1919, and that the figures of profits which are readily available for 1934 show a decided increase over 1933.

"Of course, not all industries have benefited equally. I notice from the statistics recently published in the Monthly Review of your American Paper and Pulp Association that the paper industry has not shown as conspicuous an improvement as many of our other industries. The published figures indicate that your labor costs have risen and that the ratio of the industry's payroll to total sales has considerably increased. Under such circumstances, it would be an altogether natural reaction if these were some tendency toward incomplete satisfaction with the recovery program. I do not know if this is so, but it would be a natural consequence.

"Against this feeling, if it exists, it is necessary to set the alternatives. One thing is clear today, and that is that no industry and no individual can be prosperous if the country as a whole is not moving towards prosperity and that to that extent, every indication, such as we have been having through the past year and a half, of a return toward more prosperous conditions is bound to result indirectly in an improvement for every substantial industry. If such improvement has not already taken place to the degree hoped for, we may well ask what would be the state of affairs today if conditions had been permitted to drift on as they were drifting in the early days of 1933.

"As we return to more normal conditions, the problem of restoring the relative prosperity of different industries can be faced, but in the meantime, we are in the midst of a great cooperative effort to pull ourselves out of the depression, and we cannot afford, if we are to succeed in that effort, to ask whether or not our burden may be somewhat greater than our neighbor's.

"In the past the Administration has been frequently charged by those who did not or would not understand the purpose of the recovery program with being hostile to business. Today it is being much more frequently charged, and from more dangerous quarters, with being too friendly to business. This is because it insists, as it has insisted from the beginning, that recovery means a revival of business activity based upon private initiative and enterprise.

"The policy of the recovery program has, of course, insisted that if our great and complicated business structure of today is to endure it can no longer be conducted in the old pioneer spirit of a 'land rush,' but must be brought into channels of greater order and stability. At the same time, however, it has also insisted that the primary object must be to promote a sound and steady increase in the volume of private business activity. The purpose of government action is simply to bridge over the gaps where private enterprise has temporarily withdrawn and to take such other action towards private business as may be necessary to guide it into channels of sound and steady growth. This policy has recently been reiterated in the President's new program of public relief works which has for its primary aim to prevent the development in this free country of a class of permanent pensioners of the state.

"Whenever business men are tempted to feel the burden of some governmental restriction or to become impatient because full and complete recovery to 1929 levels has not been achieved over night, it is worth while, as I have already suggested, to consider the alternatives. The depression, like every great calamity, has brought forth its brood of dangerous and sinister forces. Throughout the land unemployment and want and insecurity and hopelessness have inevitably lighted up strange impulses and created on the part of men and women stricken with poverty through no fault of theirs an unwanted receptivity to passions and panaceas all the more dangerous because of their futility.

"How near these forces were to the combustion point in the early months of 1933 few of us still care to remember, but it would be well to do so. Between those forces and the progress of an orderly recovery the Administration has stood guard by the ideals and traditions of America. The humanitarianism, the solicitude for the weak and unprivileged, which have characterized its policy have served to remind business that business if it is to prosper must maintain a prosperous community and at the same time have served to assure the innocent victims of unemployment that their importance to the national economic life would not be overlooked.

"This conception of the national interdependence of all classes has been a healing one and has called forth a spirit of cooperation which, in spite of occasional interruptions, has on the whole produced a higher degree of national unity than we have ever known before. But as the country treads the long, slow road toward recovery not all of our people can be expected to be monuments of patience—and impatience creates a fertile field for purveyors of passions and panaceas to exploit.

"The policy of the Administration has been a complicated and tentative one, resting upon a sober attempt at economic analysis and constructive statesmanship. The effort has been to bring about balance and to go only so far in any given direction as is needful to correct some undue development in another direction. Today there are groups and leaders beginning again to make their influence felt with increased power, who are not contented with this policy of balance and adjustment, but who hold out a delusive appeal to the wants and dreams of thousands of disappointed men and women.

"Only the other day I heard a pathetic story of an old couple who, since the loss of their savings have been living on a small allowance contributed every three months by a relative. Last week he received a letter from them saying that they had spent their quarter's allowance on a trip to Florida and asking for an advance on the ground that within a few months they would be able to pay him back out of the two hundred dollars a month which by that time they would be receiving from the Government. All through the land, this simple-minded faith in the magic of a panacea is being exploited by organizers who are no

doubt in many instances sincere, but who in others are frankly making human misery a road to power. Against the national disaster which the success of such exploitation would produce, all those of us who have a sense of economic realities must hold together in closed ranks behind the only agency strong enough to supply effective resistance, and that is the national administration.

"Again there is an even more dangerous bait held out which regards the national wealth as an accumulated hoard that can be divided up and shared like a great pudding. No conception less corresponds to the meaning of wealth as it exists today. Today wealth means not an accumulation of gold, nor even an accumulation of credit, but it means 'going value' and it disappears when factories shut down and machines cease to turn. Wealth means, in other words, the operation of our complicated economic system at an ever increased pace, and nothing would more certainly make it disappear than some ill-considered effort to divide it. Yet the appeal of such a platform is contagious and when backed with the ruthlessness which in other countries has bred dictatorships, it constitutes a menace hitherto unknown to our free institutions. Between us and that menace there stands one force strong enough to inspire confidence, the power of the Administration.

"Again, hopelessness and despair, bred of economic insecurity and misfortune, afford a fertile field for every sort of reckless appeal to passion and prejudice. Men and women in distress seek to strike blindly at something and there are purveyors of passion ready to gain power and prominence by telling them where to strike, by inflaming hatred against this or that element in the community, against foreigners, against members of this or that religion. The blind hates stimulated or inspired by these blatant trumpeters of discord create a demand for policies which would not merely wreck our national economy, but would split our national life into a discord of warring fragments.

"In this connection, let me mention the fact that on Sunday last one of the chief of these purveyors of passion took occasion to bring my own name into his appeal to the public. I feel honored by abuse from such a source, but I cite it here merely as a significant illustration of the type of reckless misinformation and carelessness for truth which characterizes these efforts to mislead the American people. Specifically, the charge made was that I am using my official position to withhold from the public and to suppress a certain report on the credit needs of small industry and that of course I am doing so from the dishonorable motive of hostility to small industry and subservience to big business.

"The facts are that the report in question is one which was not made to the Department of Commerce and over which neither I nor the Department of Commerce, nor any one else in it has one jot or tittle of control. It was made for and at the instance of, and was submitted to a committee of business men who constitute an advisory council for the Department and it naturally cannot come before the Department until the Advisory Council choose to present it. It is before them for their consideration and they are entitled to retain it until they satisfy themselves of its accuracy and fairness and that they want to present it. Until then the Department has no concern or connection with it.

"A summary of this report, through what I believe a perfectly innocent mishap, found its way into the newspapers some time ago and was given wide publicity. So far from seeking to stifle this summary, I advised the business council when they sought my advice that as long as this summary had become public property, they should give it general distribution while their copies lasted. I merely took the precaution to issue a statement that the document was not a publication of the Department, did not represent the views of the Department and could not be taken to represent the views of the Business Council until they had had an opportunity to adopt it. That was the truth and I thought the public was entitled to it, because for my part, I believe that in times like these, the great issues with which we are faced can only be met in the clear light of utter truth and honesty and not in the mists of passion and misrepresentation.

"I recount this incident not for its own make or because it touches me, but because it is a clean-cut example of the way in which truthfulness itself is boldly treated as an offence by public passionmongers, even under the cloak of sanctity of the blessed religion which teaches that 'ye shall know the truth and the truth shall set you free.' To ring the alarm bells of passion, to set citizen against citizen, labor against capital and capital against labor, to envenom nation against nation and the people against their government is a far easier road to notoriety and a brief day's power than patiently to analyze the processes of industry and finance and seek to heal their ills by constructive statesmanship, but the type of power founded on hate and frenzy to which such demagoguery leads is the power which destroys democracy and from which nations perish.

"There is no more appealing ground on which to attempt to arouse passion against the Administration than to charge it with being hostile to the small business man and no ground which is more completely devoid of truth. The charge has been repeatedly raised and repeatedly shown to be without foundation. There is no better evidence than the evidence drawn from the figures of commercial failures. Since the commencement of the recovery progress these have been steadily falling until they have reached the lowest point in many years.

"If there were any truth in the charge that the recovery program was unfavorable to small business, the fact would be revealed by an increase in the number of failures of such concerns. The figures fail to show any such increases, but on the contrary failures of small concerns have been declining as rapidly as failures of large enterprises. Furthermore, such statistics as are available indicate that since the commencement of the recovery program small enterprises have been springing up and many of the provisions of the codes have been expressly designed to give them protection against competitive practices which bear with such greater hardship on the small enterprises than on the large one. No doubt many small concerns have been in difficulties since the recovery program as before, and no doubt some code provisions have borne with hardship on small business as on large ones.

"The facts indicate, however, that the small concern has not been at any disadvantage, and what is not always remembered is that no concern, merely because it is small, is entitled to special favors which would release it from the obligations of fair competition and decent treatment of its employees which are enforced against its large competitors. The old-fashioned sweat-shop was a small concern, but it is a blind appeal to prejudices to argue that because it was small we should cherish and preserve it.

"Another appeal to passion against the recovery program commends itself by resort to the word 'monopoly,' and by charging that the policy of the Administration promotes 'monopoly.' The charge is only possible by covertly extending the meaning of the word 'monopoly' to include things and practices which it was never understood to mean before. Of course, monopoly in any proper sense of the word is a vicious and unsound thing to be stamped out in the public interest. In that sense the public response of hostility to monopoly is altogether sound.

"There are, however, public leaders who are so thoroughly accustomed to mistake words for things and so completely unused to facing facts and analyzing them that by a subtle alchemy of rhetoric they are enabled to attach the prejudice of a word far beyond its legitimate province. There are such leaders today who would condemn as monopoly every effort to attain fair competition and who would drive business back if they could to the old jungle competition of tooth and claw. I believe business will not be driven back. I believe it will insist that the maintenance of rules of civilized warfare should not be outlawed in a civilized community.

"I have instanced these various types of appeal to prejudice and passion simply for the purpose of indicating what I know I do not need to indicate to this audience, namely, that they are all to the last degree dangerous to the economic order and the orderly economic activity upon which business, like all other elements of the community, must depend for its prosperity. Now of all times is not the time for business men to base their attitude toward public policy on emotionalism.

"More clearly than any one else they are confronted with economic realities and more clearly than any one else they should understand that those realities must be dealt with with coolness and broad vision, with sympathy and with understanding. They cannot be so dealt with if we become a warring group of special interests, each seeking what seems its own immediate gain at the expense of the rest. They can only be so dealt with if men of economic understanding hold firmly together behind a strongly supported program of moderation and balance.

"There is but one such program before the country today. However, we may differ with some of its details, and that is the program of the Administration. And when I say that the attitude of business toward public policy should not be one of emotion, I make one exception in favor of an emotion of thorough-going, resolute determination to stand behind the Administration in defense of the solid core of American tradition against the menacing specters of emotionalism and in favor of a balanced economy based upon the orderly enterprise of free men."

Other speakers at the luncheon were: W. W. Pickard, who gave a very frank account of his experiences as Deputy Administrator and later Co-Ordinator for the Paper Industry, and a speaker described on the programme as Rene Pierre Raoul de Mauduit, who gave an exceptionally humorous discourse.

The luncheon committee, to whom much of the success of the event must be attributed, consisted of: A. B. Helffrich, chairman, Dr. E. O. Merchant, E. G. Lloyd, E. R. Lyman, W. W. Langtry, J. A. Leyden and C. J. Slicklen.

Salesmen's Association

As usual, the Salesmen's Association played a prominent part in the paper convention. The proceedings were opened on Monday afternoon when the Executive Committee met in the Waldorf-Astoria. The annual meeting was held on Tuesday morning in the Carpenter Salon. W. L. Raymond, president of the Association, presented his annual report, as follows:

"Fellow members, it is a pleasure to see so many of you here this morning. It indicates the sincerity of your interest in your Association. The last time we met together was a year ago. An important anniversary has taken place. The first full year under the operation of the Code of Fair Practices for the Paper Industry has passed. It has been a turbulent year. Never before has any period been so full of interesting problems, conflicting rumors, revisions in procedure; nor have we ever been confronted with as great a necessity for keeping constantly up-to-date. for closer attention to minute detail or a more exact knowledge of our industry.

"The cooperative agencies set up by the Code of Fair Practices supplied us with the means with which to attack these problems. We have availed ourselves of these means and, consequently, it is now a fact that many of our hopes have been realized—perhaps not to the fullest degree but at least to a sufficient extent that we view present conditions with far greater satisfaction than we have those of the past five years.

"But the fight has really just begun. The anticipated antagonism of the chiseling buyer to orderly procedure of honest merchandising is, unfortunately, the fact. We salesmen must still be constantly on our guard to counteract subterfuge, substitution, and the oft repeated phrase, 'I can get it cheaper from another mill.' In the large majority of cases the buyer cannot get a concession from another mill but he uses this misstatement as well as other means to find a weak spot in our armor to gain some advantage over his competitors.

"In some cases it is true that the unscrupulous buyer has been able to make good his threat. The various agencies established by the Code are constantly endeavoring to reduce these cases to a minimum. We can help reduce the number by being sure our own actions are above reproach and, above all, by avoiding a policy of 'doing it because the other fellow does it.' Such a policy brought about such chaotic conditions in the not far distant past that all the resistance possible should be exerted to prevent their recurrence.

"The many rumors regarding the continuation of the NRA resulted in uncertainty throughout the business world. In a recent message, President Roosevelt indicated that he would recommend that the NRA be extended for a period of two years with only comparatively simple modifications. It is hoped that his message will put an end to this uncertainty. Probably the changes which will be made in Code structure will result in a more permanent basis for the future. Undoubtedly, in consideration of these revisions a more comprehensive view will be taken of the conditions on which profits depend, not only for our own Industry, but for business as a whole.

"The open price filing provision is the most important of these conditions and it was demonstrated at the hearings held in Washington in January that opinion was predominately in favor of this provision. A recent poll of our Association shows us to be practically unanimous in favor of it.

"Open price filing should not be confused with price fixing. By its flexibility it prevents any possibility of gouging, profiteering tactics or of the artificially maintained price levels which are the elements of price fixing.

"The demonstrated ability of the paper industry for cooperative effort has resulted in a stability in which the open price filing provision is a vital factor.

When we contemplate these factors I do not think that we of the Paper Industry need fear that our Industry will be allowed to drift backwards into the non-profitable era of not so long ago. The memory of it is still too fresh and, in fact, the recovery from it is not yet so complete as to be universally satisfactory. The fact that a long step has been taken in the direction of improved conditions cannot fail to stimulate an attitude of optimism for a continuance of this improvement as time goes on.

"It is a very difficult assignment to sum up the results of the last sixteen months, particularly as there are so many cross currents of opinion among the leaders, both in governmental and industrial circles. The consoling factor,

however, which I believe most of us will admit, is contained in the word PROGRESS. We salesmen who have been on the firing line of business for the last year have the greatest respect for our General Staff, the PIA, and for our own ranking officers in our individual companies. We have been realizing the tremendous problems that the entire Paper Industry has been facing and are convinced that the Industry has made excellent progress in this Battle for Business Recovery.

"Perfection cannot be achieved overnight nor can Perfection be gained by legislation alone. It must be augmented by an intensive program of education. It is in this work that we salesmen can perform a signal service to the Industry as a whole and to our own companies individually.

"When we are confronted with the conscientious doubts and misgivings of our customers, let us point with optimism to the progress which has been made instead of dwelling on the faults of the program. We must know the correct interpretation of the Trade Customs pertaining to the grade we are selling and we must be able to explain them to the buyers. It is to this end that we are most hopeful for some action leading to a constructive simplification and standardization of Trade Customs and Trade Practices before this Convention is over. It is obvious that the job of the salesman is so to allay these doubts and fears as to cement the relationship between the mill and the buyer. Let us then know without question the fundamentals of our own jobs so that we may radiate confidence in ourselves.

"It does not follow that the necessity for a program of education is confined entirely to our dealings with our customers. It is perhaps not a great exaggeration to say that the necessity exists within our own ranks to an equal, if not a greater, degree.

"It is here that the Salesmen's Association of the Paper Industry demonstrates its value, not only to its members but to the entire indusry. The dissemination of factual information, interchange of helpful suggestions, and the friendly discussions at the meetings, at the social functions and in our frequent daily contacts are the very essence of the cooperative attitude of mind through which the program may be accomplished.

"You have benefited from the activities of your Association in the exact measure in which you have participated in these activities!

"I am certain that I am speaking for the entire membership of the Salesmen's Association when I say that we realize the necessity for wholehearted, loyal cooperation with the general strategy and program of the Paper Industry. The individual salesman realizes that neither he nor his company can progress faster than the Industry as a whole. We must move all together in a common cause.

"The scope of your Association has been increased to a marked degree during the past year by the highly successful membership campaign by which we have obtained representatives from branches of the Industry which were not represented before.

"The Membership Committee which started out under the Chairmanship of J. K. Hutchison, Jr. and, after he became vice president, under the leadership of S. C. Knode, has worked untiringly as have also a great many of the individual members, with the result that whereas last February we had 99 active members, today we have 186—not far short of double. It is with sincere appreciation that I wish to compliment the Committee and the individual members for the degree of success which has attended their efforts.

"I cannot pass on from the subject of membership without first saying a word of appreciation to our first President and still most loyal supporter, George K. Gibson, through whose helpfulness and generosity the A-Z Directory was made available.

"Considerable progress has been made in expanding the usefulness of our weekly Bulletin. The effectiveness of this publication will continue to increase as the value of disseminating factual information through this means is realized and the sources of the information are made available. Also, the fact that we now have a gratifying cash balance in Treasury will contribute to an enlargement of this activity.

"For the last few weeks I have been in communication with a group of mill representatives on the west coast who have formed themselves into a club primarily for social and fraternal purposes. There are 55 men in the group. The advantages of becoming affiliated with our Association have been pointed out to them and from the last letter I received, I have every reason to believe they will join us in a body in the near future.

"This will be an important step in increasing the national influence of our Association. The information regarding the formation of this group came from P. A. Howard, of the Howard Publishing Company, who also wrote them, advising that they join with us. We are deeply grateful to Mr. Howard for the support and goodwill which he has always evidenced in so many ways.

"The Annual Golf Outing which is held in October by the Western Division in conjunction with the Fall Meetings of the National Paper Trade Association, was as usual most successful. The large attendance composed of men from all branches of the industry indicates the growing interest in this activity.

"In all of our activities we have been heartily supported by the Trade Press and I am glad of an opportunity to express to them our appreciation of their cooperation.

"It has been an inspiration to work with the division officers and the members of Executive and Advisory Committees who have shown such wholehearted and constructive cooperation in the planning and execution of our activities.

"The excellent spirit of cooperation and initiative which has been shown by the individual members has contributed in a large measure to the success of our undertakings.

"And now as I turn over the gavel to your newly elected president, my heartiest wish for him is that you continue the zeal for your Association which you have shown during the past year."

Officers for the ensuing year were elected, as follows:

President, Creighton W. Whiting, American Writing Paper Company.

Vice-President Eastern Division, Charles E. Strickland, The Brown Company.

Vice-President Middle Western Division, R. E. Johnson, Northwest Paper Company.

It was also announced that Dr. E. O. Merchant would in future act as secretary of the Association and editor of the Weekly Bulletin.

National Paper Trade Association

At the thirty-second annual convention of the National Paper Trade Association, which was held for four days at the Waldorf-Astoria Hotel, H. L. Zellerbach of the Zellerbach Paper Company, San Francisco, was elected president. The other officers elected were as follows:

Vice-president in charge of Fine Paper Division, O. F. Marquardt, Marquardt & Co., New York City; vice-president in charge of Wrapping Paper Division, F. Bendel Tracy, Fort Hill Paper Company, Boston; treasurer,

Charles Addoms, Miller & Wright Paper Company, New York City.

The Executive Committee includes the officers and the following: N. A. Considine, Allen Chadwick, F. W. McCarty and E. P. Magel.

The Code Athority, with A. W. Leslie, Code Authority chairman, presiding, held an informal meeting Thursday morning at which the present status and outlook with regard to code activities was discussed. S. A. Rosenblatt, compliance and enforcement director, NRA, delivered an interesting address. The Code Authority of the Paper Distributing Trade consists of the following:

To represent Region 1, F. Bendel Tracy; Region 2, O. F. Marquardt; Region 3, Sidney Wellhouse; Region 4, George Cobean; Region 5, Ralph Beckwith; Region 6, Sidney Strauss, and Region 7, H. L. Zellerbach. The two members of the Code Authority to present non-members of the trade are H. B. Finch and Thomas J. Nagle. F. Bendel Tracy and Ralph Beckwith take office on the Code Authority for the first time.

Among other important items brought before the meeting were the report of the board of directors involving consideration of proposed amendments to the by-laws and the report of the treasurer, Charles Addoms, and consideration of a revised financing plan. A. H. Chamberlain, executive secretary, made his annual report and R. M. Beckwith gave a general report for the survey committee.

President A. W. Leslie presided at the annual meeting and delivered his address, which was followed by an address given by Philip P. Gott, manager of the Trade Association Department of the Chamber of Commerce of the United States.

"The thirty-hour week bills are opposed in their entirety by most trade associations," said Mr. Gott, "while modifications are suggested in other bills before Congress and numerous state legislatures. The business man more and more recognizes the necessity of scrutinizing legislative proposals and ascertaining the viewpoint of industry thereon through their trade associations, which, when crystallized, may be individually and collectively presented to the government."

"Trade associations," said Mr. Gott, "offer constructive suggestions which are helpful in adopting legislation which will be practicable and applicable to the intricacies of our business system."

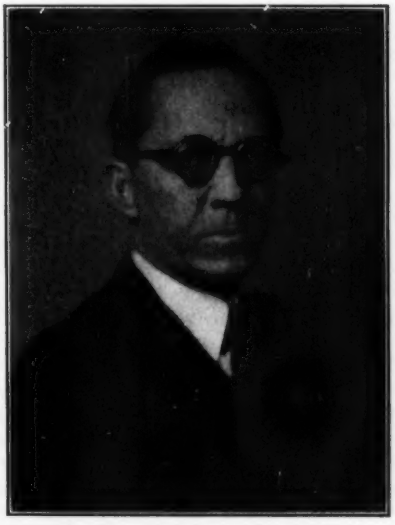
In discussing the national recovery program, Mr. Gott pointed out that 735 codes have been approved, including 187 supplemental codes, a number of which include provisions which are not legally or practicably enforceable and which in many instances were not so considered when incorporated in the codes. Mr. Gott further stated that "there has been much confusion with respect to the exact functions of the code authorities and their relationship to trade associations. As new legislation is created there should be a clear understanding of the functions of code administrative agencies. Provisions which are very largely educational or instructional in character, which are not legally or practicably enforceable, should not be incorporated in codes. Commendable as many such proposals may be, their incorporation in codes is obviously not in accord with our concepts of government The submission of codes constitutes a magnificent effort on the part of industry to establish principles and practices of business conduct which are in the public interest.

"The National Chamber," stated Mr. Gott, "believes that industry should be permitted to formulate and put into effect rules of fair competition which, upon receiving governmental approval, should be enforced against all concerns in the industry."

"Industries for many years," said Mr. Gott, "have attempted to raise the standards of business progress through the adoption of codes of ethics, the submission of trade practice rules with the Federal Trade Commission, and more recently the submission of codes of fair competition to the National Recovery Administration."

Mr. Gott further stated that "trade associations have not only promoted the public interest through the consideration of legislative subjects and the establishment of fair competition, but have also assisted management in meeting its immediate problems relating to production, distribution, employment and finance, through the collection and dissemination of statistics, the establishment of grading rules and specifications, the development of trade promotional programs to extend the markets, the conduct of educational campaigns and the furtherance of efficient business practices."

H. L. ZELLERBACH,
President, National Paper Trade Association



A. H. CHAMBERLAIN,
Secretary, National Paper Trade Association

TAPPI Luncheon

The Twentieth Annual Luncheon of TAPPI, held in the Grand Ballroom of the Waldorf-Astoria on Wednesday, February 21, at 1.30 P.M. was the largest attended of any yet held by the Technical Association. The TAPPI Gold Medal was presented to Edwin Sutermeister, of the S. D. Warren Company, by Frederick C. Clark, a former vice-president of the Technical Association. Mr. Sutermeister responded gracefully and in his talk not only looked backward over his thirty-five years in the industry, but sent out a word of encouragement to the younger technician who might be doubtful of his future of the industry.

He was followed by S. L. Wilson, president of the American Writing Paper Company and the retiring president of the American Paper and Pulp Association, who spoke on the progress made in the paper industry under the NRA and complimented TAPPI on its splendid work in the field of coordinating research and production.

The speaking was interrupted at this point for the annual election of officers, and all the present officers of the association were reelected to their respective offices.

Captain Joseph Battley, Divisional Administrator of the National Recovery Administration, in charge of the Paper and Pulp Industry, spoke on the need for cooperation between those formulating industrial codes and those who would operate under these codes.

He was followed by Ernst Mahler, chairman of the Central Grading Committee of the Paper Industry Authority. Stuart B. Copeland, vice-president of the Eastern Manufacturing Company, and F. J. Sensenbrenner, president of the Kimberly-Clark Corporation.

The president of the Technical Association, Clark C. Heritage, introduced the various speakers, briefly reviewed the progress of TAPPI and indicated the future efforts of the organization along educational lines. He also informed those attending the luncheon that the Fall meeting of TAPPI would be held at Atlantic City and indicated that, although the date had not been set, tentatively it would take place the third week in September.

Sulphite Paper Division

At the several meetings of the Sulphite Paper group trade practices were discussed and plans for the year's work of the association were made.

At the meeting held Tuesday, February 19, the following officers were elected: Chairman, Rufus L. Sisson, Jr., Racquette River Paper Company, Potsdam, N. Y.; vice chairman of the Unbleached Group, George Stuhr, Continental Paper and Bag Corporation, New York; vice chairman of the M. G. Sulphite Group, Edgar W. Kiefer, Port Huron Sulphite and Paper Company, Port Huron, Mich.; vice chairman of the Manila Group, Walter B. Merlin, Hollingsworth & Whitney Company, New York; vice chairman of the Bleached Group, Thomas A. Hendry, Fraser Industries, Inc., New York.

The new Board of Governors of the Association, which meets monthly, includes the following: John Alexander, Nekoosa Edwards Paper Company, Port Edwards, Wis.; (alternate J. E. Auchter); D. C. Everest, Marathon Paper Mills Company, Rothschild, Wis., (alternate, John Stevens, Jr.); Thomas A. Hendry, Fraser Industries, Inc., New York; Edgar W. Kiefer, Port Huron Sulphite and Paper Company; Richard A. McDonald, Crown Willamette Paper Company, San Francisco, Cal., (alternate, H. O. Nichols); Charl H. Morian, Cherry River Paper Company, Philadelphia; Walter B. Merlin, Hollingsworth & Whitney Company; Rufus L. Sisson, Jr., Racquette River Paper Company, and George Stuhr, Continental Paper and Bag Corporation.

The Executive Committee, Board of Governors, consists of George Stuhr, Thomas A. Hendry, Walter B. Merlin and H. O. Nichols.

Book Paper Manufacturers Association

George H. Mead was reelected president of the Book Paper Manufacturers Association at the annual meeting held in the Jansen Suite of the Waldorf Astoria on Wednesday. P. H. Glatfelter, of the P. H. Glatfelter Company, was elected treasurer.

J. R. Miller, of the West Virginia Pulp and Paper Company, was named as the representative on the Board of Governors of the American Paper and Pulp Association, succeeding George H. Mead. The new alternate named was G. K. Ferguson, of the Watervliet Paper Company.

Directors named for two years were George H. Mead, the Mead Corporation; R. D. Smith, of S. D. Warren Company; G. K. Ferguson, Watervliet Paper Company, and P. H. Glatfelter, P. H. Glatfelter Company.

Directors named for two years are Logan G. Thomson, Champion Coated Paper Company; W. T. Schmitt, Bryant Paper Company; J. N. Bergstrom, Bergstrom Paper Company, and J. S. Sensenbrenner, Kimberly-Clark Corporation.

For three years: J. R. Miller, West Virginia Pulp and Paper Company; C. A. Gordon, of Oxford Paper Company; J. H. Fearing, International Paper Company; A. E. Curtenius, Kalamazoo Paper Company.

C. G. Parker is managing director of the association and C. L. Barnum is the assistant managing director. Richard S. Berry is the secretary and assistant treasurer.

Ground Wood Paper Manufacturers

The Ground Wood Paper Manufacturers Association held a series of important meetings at the Waldorf-Astoria during the week, at which the Recovery Code and other problems confronting the industry were freely discussed. The following officers were elected for the coming year:

President, C. H. Sage, Kimberly-Clark Corporation.

Eastern Vice President, T. C. Hendry, Fraser Industries, Inc.

Western Vice President, Walter L. Mead, Consolidated Water Power and Paper Company.

Executive Vice President, R. E. Canfield.

Secretary-Treasurer, E. O. Merchant, New York.

Board of Governors: *East*—T. C. Hendry; C. R. McMillan, St. Regis Paper Company; W. N. Hurlbut, International Paper Company; Samuel Pruyn. *West*—Walter L. Mead; L. L. Alsted, Combined Locks Paper Company; J. H. Slater, Escanaba Paper Company; C. H. Sage. *Pacific Coast*—H. O. Nichols, Crown Willamette Paper Company.

Paper Mill Supply Dealers Banquet

One of the most popular events of Paper Week was the Twenty-Seventh Annual Banquet of the New York Dealers in Paper Mills Supplies, Inc., which was held in the Hotel Commodore, New York, on Wednesday evening.

There was a large and enthusiastic attendance of members and their invited guests, who sat down to an excellent Menu and enjoyed a diversified program presented by talented artists from the Stage and night clubs.

Tables were reserved for the following: Atlantic Waste Paper Company; Baltimore Association; Thomas Barrett & Co.; D. Benedetto, Inc.; Robert Blank, Inc.; A. Bloch & Co.; Boston Association; C. F. Bradley; C. J. Brown; Cantasano Bros.; J. H. Carlo & Co.; Jas. Carrano & Son; Darmstadt, Scott & Courtney; Derrico Company; Delia Waste Products; Diamond Mills Paper Company; Economy Baler Company; Gaccione Bros. & Co.; Giove Company, Inc.; H. Goldman & Co.; Louis Gottlieb & Bro.; Daniel M. Hicks, Inc.; E. J. Keller & Co.; Joe Levy & Son; Loumar Textile; Geo. W. Millar & Co., Inc.; National Association of Waste Material Dealers, Inc.; Philadelphia Association; Republic Paper Stock Company; H. Rosenberg; S. Schapiro & Sons; W. Steck & Co.; Sterling Mill Supply Company; Valva Paper Stock Company; H. P. & H. F. Wilson and Wilson Paper Stock Company.

U. S. Pulp Producers Elect New Board

At a meeting held Tuesday, February 19, at the Waldorf-Astoria, the United States Pulp Producers Association elected its Board of Directors, which includes the following:

To represent the East: Norman Brown, The Brown Company; Stuart B. Copeland, Eastern Manufacturing Company; Armor Hollingsworth, Penobscot Chemical Fibre Company.

To represent the Lake States: J. M. Conway, Hoberg Paper and Fibre Company; Earl McCourt, Consolidated Water Power and Paper Company; R. O. Warner, Minnesota and Ontario Paper Company.

To represent the South: John Harvey, Southern Advance Bag and Paper Company, Inc.; Reuben Robinson, Champion Fibre Company; Elis Olsson, Chesapeake Corporation.

To represent the Pacific Coast: Ossian Anderson, Puget Sound Pulp and Timber Company; E. M. Mills, Ranier Pulp and Paper Company; R. B. Wolf, Weyerhaeuser Timber Company.

To represent the Industry at large: Howard E. Beedy, Oxford Paper Company; Ralph Shaffer, Shaffer Pulp Company; Norman W. Wilson, Hammermill Paper Company.

Writing Paper Manufacturers Association

At the annual meeting of the Writing Paper Manufacturers Association, held in the Waldorf Astoria on Wednesday, the officers and executive committee for 1935 were elected as follows:

President, I. N. Esleeck, Esleeck Manufacturing Company, Turners Falls, Mass.

Vice-Presidents, J. L. Bagg, Millers Falls Paper Company, Millers Falls, Mass., and F. H. Savage, International Paper Company, New York.

Secretary-Treasurer, E. H. Naylor, 122 East 42nd St., New York.

Executive Committee: I. N. Esleeck, chairman, Esleeck Manufacturing Company, Turners Falls, Mass.; J. L. Bagg, Millers Falls Paper Company, Millers Falls, Mass.; H. R. Baldwin, Hammermill Paper Company, Erie, Pa.; Norman Bardeen, Lee Paper Company, Vicksburg, Mich.; D. K. Brown, Neenah Paper Company, Neenah, Wis.; W. M. Crane, Jr., Crane & Co., Inc., Dalton, Mass.; H. F. Harrison, West Virginia Pulp and Paper Company, New York; H. H. Howard, the Howard Paper Company, Urbana, Ohio; W. S. McClellan, P. H. Glatfelter Company, Spring Grove, Pa.; H. A. Moses, Strathmore Paper Company, West Springfield, Mass.; and F. H. Savage, International Paper Company, New York.

American Waxed Paper Association

The annual meeting of the American Waxed Paper Association was held in the Waldorf-Astoria on Tuesday. The officers will be elected in April. The executive committee was elected as follows:

Vasco E. Nunez, vice-president, Nashua Gummed and Coated Paper Company, Nashua, N. H.; Van H. Wilshire, president, Specialty Papers Company, Dayton, Ohio; R. B. Donnelly, president, Central Waxed Paper Company, Chicago, Ill.; Wm. J. Eisner, president, Newark Paraffine and Parchment Company, Newark, N. J.; Walker Hamilton, secretary, Riegel Paper Corporation, New York, N. Y.; Howard Larsen, sales manager, Crystal Tissue Company, Middletown, Ohio; Stuart Moore, president, Dixie Waxed Paper Company, Dallas, Texas; H. O. Nichols, assistant sales manager, Western Waxed Paper Company; Preston E. Roberts, president, Mid-West Waxed Paper Company, Fort Madison, Ia.; Russell Buhrer, general manager, American Bread Wrapper Company; P. S. Fiske, secretary-manager, 100 East 42nd street, New York.

Bristol Board Division

At the annual meeting of the Bristol Board Division of the Paper and Pulp Industry held on Monday, February 18 at the Waldorf-Astoria Hotel, it was voted to elect the following slate of officers to serve as the Executive Authority for the coming year:

R. G. Westad, Chairman.
R. I. Worrell, vice chairman.
Norman Harrower.
Joseph E. Holmes.
S. Dillingham.
James B. Ramage.
William R. Driver, Jr., secretary.

It was also voted to approve the budget for the fiscal year from February 1, 1935 to January 31, 1936, as presented by the secretary.

The subject of Trade Customs was considered at length with an aim to clarify and amend the same where necessary.

Newsprint Manufacturers

The annual meeting of the Association of Newsprint Manufacturers of the United States was held in the Le Perroquet Suite of the Waldorf Astoria on Wednesday morning. The following officers were elected for the ensuing term:

Chair, A. L. Hobson, St. Croix Paper Company.

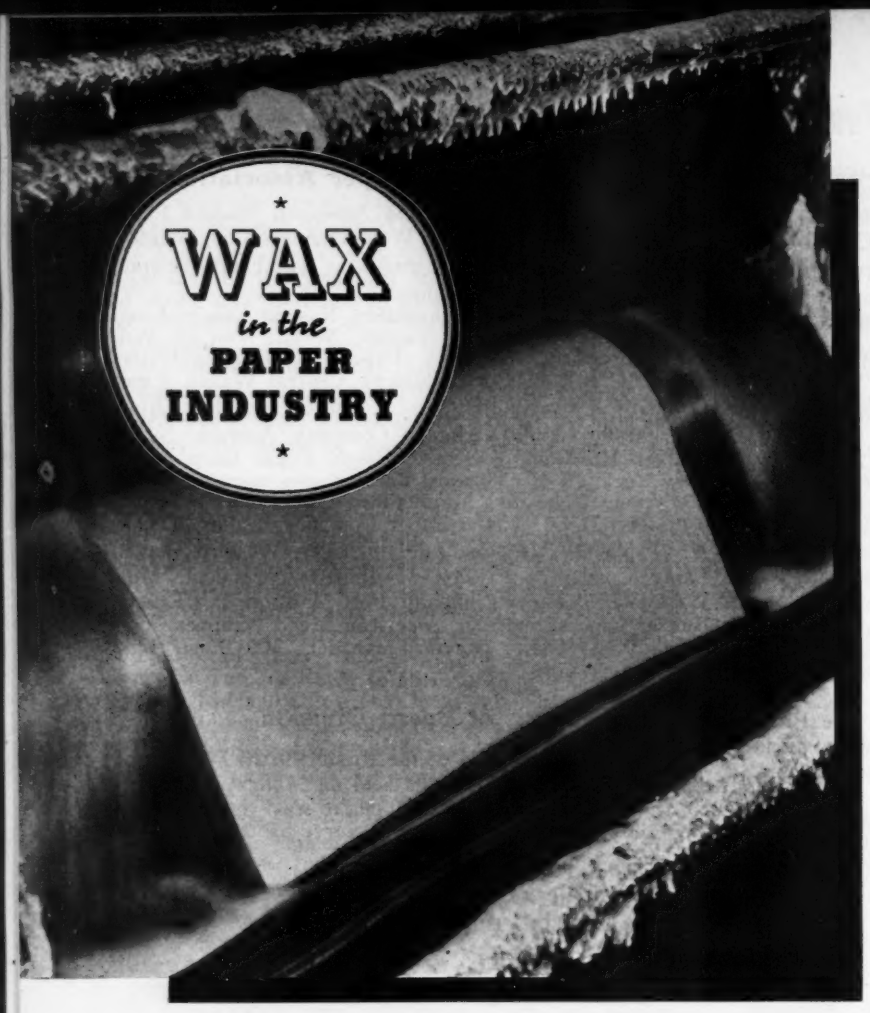
Vice Chairmen, C. K. Blandin, Blandin Paper Company; and J. D. Zellerbach, Crown-Willamette Paper Company.

Advisory Committee: A. R. Graustein, International Paper Company; Edgar Rickard, Pejebscot Paper Company; R. H. M. Robinson, Minnesota and Ontario Paper Company; W. S. Wyman, Maine Seaboard Paper Company.

Tissue Manufacturers

A the annual meeting of the Association of Manufacturers and Converters of Tissue, held on Thursday at the Waldorf-Astoria Hotel, C. W. Ranck, of the Crystal Tissue Company, was elected president. Frank Vaughan, of the Bay West Paper Company, was elected vice-president and B. F. Picola was reelected treasurer.

The following chairmen were elected for the six separate groups affiliated with the Association of Manufacturers and Converters of Tissue: George Dunn, Dunn Sulphite Paper Company, Port Huron, Mich.; chairman,



Excerpts from a New and Interesting Standard Oil "Monograph"...

"Because the two principal uses of waxed paper and cartons are for bread wrappers and butter containers, the paraffine wax used must possess the highest degree of purity and freedom from taste or odor."

"Paraffine is much like butter in that it will pick up and absorb other odors. It is particularly susceptible to odors from allied products, such as kerosene and gasoline. Materials of this sort should never be used in cleaning machines or containers."

"Two important qualities of waxed paper, transparency and gloss, depend largely upon rate of cooling."

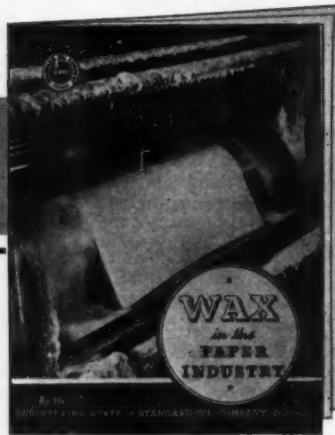
"By regulating the speed of the machine, length of the draw, temperature of the wax bath, and the temperatures of the cooling rolls, maximum transparency for a given sheet of paper can be obtained."

"If waxed paper is not thoroughly and uniformly cooled, the temperature of surface will rise due to the dissipation of the heat from the interior and the finish will become dull."

★

Standard (Indiana) engineers serving the midwestern states are probably calling at your plant regularly. Use them when their suggestions and the facilities of this company can be of assistance to you

BOTH the properties of paraffine wax and the mechanical problems met in its application are dealt with thoroughly in a practical paper which Standard Oil (Indiana) Engineers have just prepared. Careful research and years of experience with the specialized uses of wax in the paper industry have equipped Standard Engineers to be of direct, practical assistance to you. Use the coupon below to get your copy of this paper entitled "Wax in the Paper Industry."



STANDARD OIL **(INDIANA)**

Copr. 1935, Standard Oil Co.

Standard Oil Company (Indiana) (40)
910 S. Michigan Ave., Chicago, Ill.

Gentlemen: Kindly send copies of the papers checked to the undersigned. It is understood that no obligation is implied.

- ☐ "Wax in the Paper Industry."
- ☐ "The Lubrication of Beaters and Jordans."
- ☐ "Paper Machine Lubrication."
- ☐ "The Lubrication Engineer—his Value to You."

(attach list of any additional subjects in which you are specifically interested . . .)

Name..... *Position*.....

Company.....

Address.....

City..... *State*.....

Check Other Papers Desired

Specific groups of lubrication problems in the paper industry are treated in similar papers involving many practical and helpful suggestions. Check those listed on the coupon and attach a list of any additional problems on which you desire practical advice.

Fulton, N. Y., chairman, Roll Toilet Paper Group; A. B. Lowenstein, National Paper Products Company, chairman, Interfold Toilet Tissue Group; Eli Meyer, Sterling Paper Company, Tampa, Fla., chairman, Fruit Wrap Group; Z. W. Ranck, Crystal Tissue Company, Middletown, Ohio, chairman, Wrapping Tissue Group; Frank Vaughan, Bay West Paper Company, Paper Towel Group.

Waterproof Paper Manufacturers

At the annual meeting of the Waterproof Paper Manufacturers Association, held Tuesday, February 19, the following officers were elected:

President, Frank E. Donavon, United Paper Company, East Braintree, Mass.

Vice President, A. M. Anderson, Sisal Kraft Company, New York.

Douglas A. Crocker was reelected secretary-treasurer and Louis Slegal was made assistant secretary.

The above officers and the following include the Executive Committee: Henry W. Stark, Rexford Paper Company, Milwaukee, Wis.; Fred P. Wood, Simplex Paper Corporation, Adrian, Mich., and George Chadwick, W. Ralston & Co., Niagara Falls, N. Y.

All the officers automatically become members of the Code Authority, with Frank E. Donavon, chairman; and A. M. Anderson, vice-chairman.

Sulphate Pulp and Board Association

Developments of the past year and the planning of activities for the coming year were discussed at the annual meeting of the Sulphate Pulp and Board Association, held in the Waldorf-Astoria. The election of officers for the coming term resulted as follows:

President, A. C. Goodyear, Bogalusa Paper Company.

Vice-President, H. W. Emerson, Albemarle Paper Manufacturing Company.

Secretary-Treasurer, S. M. Hudson, 19 West 44th street, New York.

The executive committee follows: H. Lutcher Brown, Brown Paper Mills Company; J. P. Hummell, Hummell-Ross Fibre Corporation; H. L. Wollenberg, Longview Fibre Company; J. D. Zellerbach, National Paper Products Company; D. C. Everest, Ontonagon Fibre Corporation; R. J. Cullen, Southern Kraft Corporation; J. R. Miller, West Virginia Pulp and Paper Company.

Paper Napkin Manufacturers

The National Association of Paper Napkin Manufacturers held a meeting of the Executive Authority at the Waldorf Astoria on Monday. At this meeting, the following officers of the executive committee and code authority were elected:

Grafton Houston, Fort Howard Paper Company, Green Bay, Wis., chairman of Code Authority and also executive committee; Morris Housen, Erving Paper Mills, Mass, vice-chairman; Russell Buhrer, Standard Pulp Products Company; Paul Graves, American Tissue Mills; Robert Watson, Tuttle Press, Appleton, Wis.; Ed Dahl, Graff Paper Company, St. Paul, Minn.; C. A. Reed, C. A. Reed Company, Williamsport, Pa.

George J. Lincoln, Jr., has resigned as secretary but will serve until the next Code Authority meeting.

Kraft Paper Association

There was an excellent attendance at the annual meeting of the Kraft Paper Association, which was held in the Le Perroquet Suite of the Waldorf Astoria on Wednesday. The following officers were elected:

President, L. C. Anderson, Sorg Paper Company.

Vice President, J. L. Stille, Southern Kraft Corporation.

Executive Committee: W. H. Anders, Nashua River Paper Company; J. N. Harvey, Advance Bag and Paper Company; C. R. McMillen, St. Regis Paper Company; John R. Miller, West Virginia Pulp and Paper Company; N. S. Stone, Mosinee Paper Mills Company; J. Macdonald, Crown Willamette Paper Company; Karl E. Stansbury, Thilmany Pulp and Paper Company; Norman Brown, the Brown Company; A. C. Goodyear, Bogalusa Paper Company; and H. W. Ellerson, Albemarle Paper Company.

Cover Paper Manufacturers Association

The annual meeting of the Cover Paper Manufacturers Association was held in the Waldorf Astoria on Wednesday afternoon, when the officers and executive committee for 1935 were elected as follows:

President, R. S. Madden, American Writing Paper Company, Inc., Holyoke, Mass.

Vice-President, J. B. Shepherd, Peninsular Paper Company, Ypsilanti, Mich.

Secretary-Treasurer, E. H. Naylor, 122 East 42nd St., New York.

Executive Committee: R. S. Madden, Chairman, American Writing Paper Company, Inc., Holyoke, Mass.; G. H. Beckett, the Beckett Paper Company, Hamilton, Ohio; A. E. Frampton, Hammermill Paper Company, Erie, Pa.; J. B. Shepherd, Peninsular Paper Company, Ypsilanti, Mich.; and J. B. VanHorn, Holyoke Card and Paper Company, Springfield, Mass.

Pulp and Paper Machinery

The Pulp and Paper Machinery Association met Wednesday morning, February 20, at the Waldorf Astoria, and reelected the following officers:

President, Phillips Dennett, Bird Machine Company.

Vice President, S. L. Bauer, Bauer Bros. Company.

Treasurer, W. B. Wilshusen, Cameron Machine Company.

The Board of Directors comprise the above officers and J. E. Waterhouse, of the Montague Machine Company; A. B. Clark, of J. O. Ross Engineering Corporation; and S. G. Bevis, Bevis Machine Company. John Cornell, *The Paper Mill*, New York, is secretary.

There was also a meeting of the Code Authority at which routine business was discussed and trade practice complaints plans were adopted.

Paper Merchants Hold Dinner Party

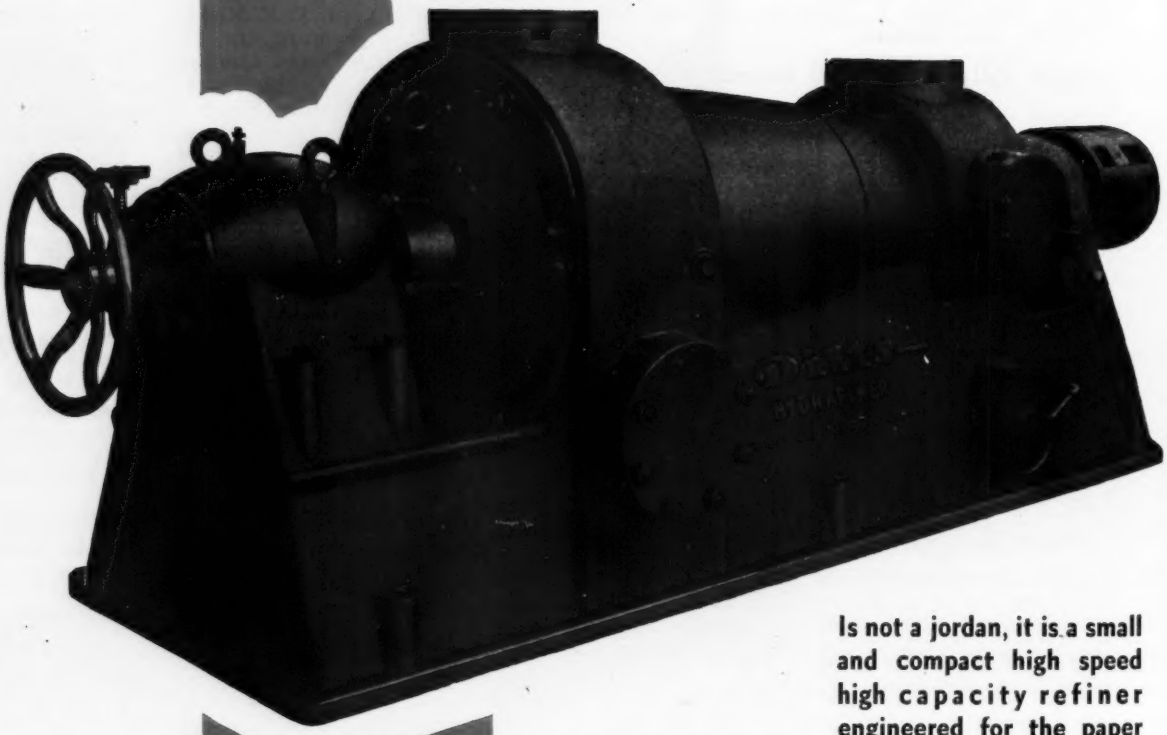
The National Paper Trade Association of the United States held a very successful dinner party at the Casino Theatre, where the Folies Bergeres is the principal attraction. The program was quite out of the ordinary and was thoroughly enjoyed by all present. Among the guests were many prominent paper manufacturers and officials of the American Paper and Pulp Association and its various divisions.

Cut Card Association

The Cut Card Association held a series of meetings at the Waldorf-Astoria during the week. The members agreed to organize a national promotional campaign in the coming year to make customers and printers realize the value of business and social cards.

Mrs. M. E. Bernhardt, secretary and sales manager of the Leader Card Works, Milwaukee, Wis., was re-elected secretary of the association.

Dilts Hydrafiner



Is not a jordan, it is a small and compact high speed high capacity refiner engineered for the paper maker. Send for Catalog.

Dilts
MACHINE WORKS, Inc. FULTON, N.Y.
"Your Paper is made in your Beaters"

Linweave Association Meets

At the annual meeting of the Linweave Association, held February 16 at the Waldorf-Astoria Hotel, New York City, the following Association officers were elected for the ensuing year: President—A. W. Leslie, John Leslie Paper Company, Minneapolis, Minn.; Vice-President—J. L. Wells, Sloan Paper Company, Atlanta, Ga.; Secretary-Treasurer—J. H. Brewer, Storrs & Bement Company, Boston, Mass.

E. V. Johnson, general manager of the United States Envelope Company, presided and introduced the new association manager, Thomas H. Chambers, who reviewed sales records over the past year and outlined new developments in the Linweave Papers. Mr. Johnson stated that the past year had given many indications of improving business. There has been a greater demand for quality lines—much of it making up the 20 per cent increase Linweave has experienced in the last year.

E. Craig Greiner of N. W. Ayer & Son, Boston, presented to the meeting the 1935 program of magazine advertising on Linweave Wedding Papers, and E. L. Wood, T. N. Fairbanks, E. L. Wight and C. A. Reynolds of the United States Envelope Company spoke briefly on various phases of the new Linweave sales promotion material.

A new black cover paper, Linweave Ebony, was introduced at the meeting under the slogan "100 per cent Rag, 100 per cent Black." This paper, made in the United States, is, according to Mr. Johnson, superior to any similar foreign paper.

The Linweave Sales Trophy, a striking, engraved, two-color plaque, awarded annually to that member of the Association who has shown the largest percentage of increase in sales, went this year to the Beekman Paper and Card Company, New York City.

Presentation to Sidney L. Willson

At a private dinner of the Executive Committee of the American Paper and Pulp Association, held in the Waldorf-Astoria on Friday evening, a handsome volume, bound in leather, containing letters of appreciation from all the members of the executive committee and the board of governors representing all divisions of the paper industry, was presented to Sidney L. Willson, the retiring president of the association, in acknowledgement of his splendid work during the strenuous six years of his administration.

Harrison R. Baldwin Honored

At the seventy-fourth annual meeting of the Writing Paper Manufacturers Association, held in the Waldorf-Astoria on Wednesday, Harrison R. Baldwin, of the Hammermill Paper Company, Erie, Pa., as the retiring president, was presented with a large case of flat silver by his many friends among the writing paper manufacturers. The presentation was made on behalf of his friends by W. J. Raybold, of the Rising Paper Company, Housatonic, Mass.

Cardboard Manufacturers Association

The annual meeting of the Cardboard Manufacturers Association was held in the Waldorf-Astoria on Wednesday. Lowell Emerson, of the Rhode Island Cardboard Company, Pawtucket, R. I., was re-elected president.

Other officers were elected as follows: Vice chairman, Kendall Wyman, Champion Coated Paper Company. Executive Committee—Donal V. Lowe, Lowe Paper Company (Box Board Division); Fred C. Heinritz, Appleton Coated Paper Company (Coated Tag Division); J. A. Moses, Falulah Paper Company (Coated Blanks and Miscellaneous Cardboard Division); J. E. Van Horn, Holyoke Card and Paper Company (Photomount Group).

Paper Makers Advertising Club

The annual luncheon and meeting of the Paper Makers Advertising Club was held in the Carpenter White Room of the Waldorf-Astoria on Tuesday afternoon. The following officers were elected for the ensuing term:

President, Orin Somerville, Beckett Paper Company.

Vice President, Edson Dunbar, Crocker-McElwain Company.

Treasurer, Morris Park, Beveridge-Marvellum Company.

Secretary, Richard F. Linsert, American Writing Paper Company.

Blotting Paper Manufacturers

The Association of Blotting Paper Manufacturers held their annual meeting during the week at the Waldorf-Astoria. The officers for the coming year were elected, as follows:

Chairman, D. A. Smith, vice president, District of Columbia Paper Manufacturing Company.

Vice President, Henry Mead, president, Wrenn Paper Company, Middleton, Ohio.

These two officers and James F. Ryland, vice president, Standard Paper Manufacturing Company, Richmond, Va., are the Code Authority for the industry.

Specialty Paper and Board Affiliates

At the general meeting of the Specialty Paper and Board Affiliates, held Wednesday afternoon at the Waldorf-Astoria, general business conditions were discussed and a slight change was made in the Constitution at the request of the Administration. The following officers were elected:

President, Louis Vose, Hollingsworth & Vose Company.

Vice President, Clark Morian, Cherry River Paper Company.

Colonel B. A. Franklin, 95 State street, Springfield, Mass., is secretary.

Glassine & Greaseproof Manufacturers

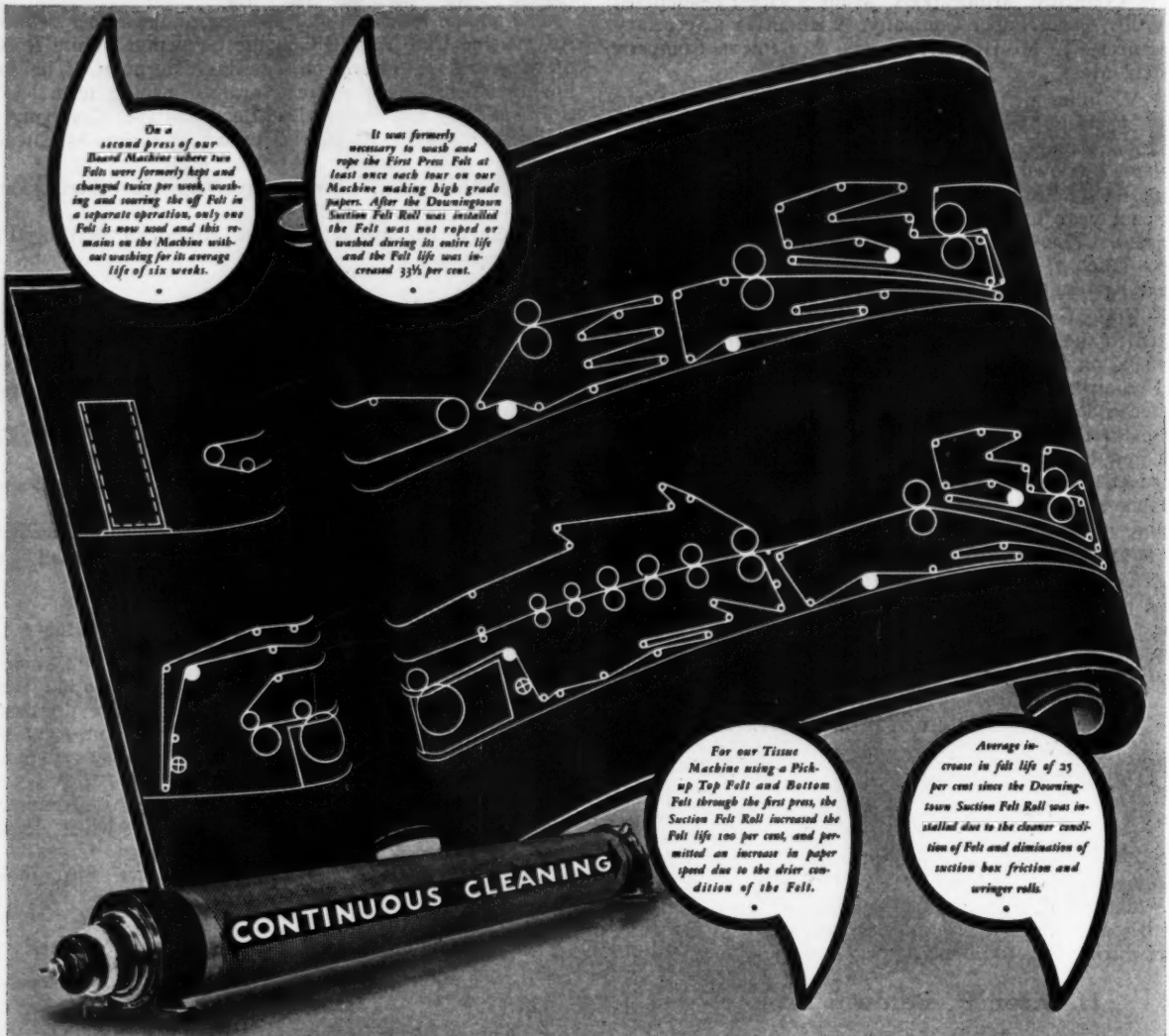
At the annual meeting of the Glassine and Greaseproof Manufacturers Association, held at the Waldorf-Astoria this week, Robert F. Nelson, of the Glassine Paper Company, was re-elected president. Mr. Nelson also serves on the Code Authority, which also includes Paul E. Hodgson, Deerfield Glassine Company; Folke Becker, Rhinelander Paper Company; Carl Stansbury, Thilmany Pulp and Paper Company and J. L. Riegel, Riegel Paper Corporation. Richard C. Staelin, Chanin Building, New York, is the secretary.

Presentation to H. W. Ellerson

At the annual meeting of the Kraft Paper Association, held in the Waldorf-Astoria on Wednesday, H. W. Ellerson, president of the Albemarle Paper Manufacturing Company, and the retiring president of the association, was the recipient of a solid silver tray with twelve goblets, specially made by Tiffany's.

C. R. McMillan, of the St. Regis Paper Company, made the presentation on behalf of the members. Resolutions were presented by J. N. Harvey, of the Advance Bag and Paper Company.

DOWNINGTOWN


On a second press of our Board Machine where two Felts were formerly kept and changed twice per week, washing and souring the off Felt in a separate operation, only one Felt is now used and this remains on the Machine without washing for its average life of six weeks.
It was formerly necessary to wash and rope the First Press Felt at least once each tour on our Machine making high grade papers. After the Downingtown Suction Felt Roll was installed the Felt was not roped or washed during its entire life and the Felt life was increased 33⅓ per cent.
CONTINUOUS CLEANING
For our Tissue Machine using a Pick-up Top Felt and Bottom Felt through the first press, the Suction Felt Roll increased the Felt life 100 per cent, and permitted an increase in paper speed due to the drier condition of the Felt.
Average increase in felt life of 25 per cent since the Downingtown Suction Felt Roll was installed due to the cleaner condition of Felt and elimination of suction box friction and wringer rolls.

FULL SPEED NON-STOP FELT SERVICE

Slowing down the machine as the felts fill-up and shut-downs for washing and roping are both eliminated by the Downingtown Suction Felt Roll. Its continuous, uniform, full width "suction without friction" cleanses and rejuvenates the felt without stretching the felt and without abrasion or compression of the nap. The average service life of all felts is thus prolonged 25% by this gentle, thorough cleaning . . . The diagrams show how the Downingtown Suction Felt Roll replaces a plain felt roll in any position on any machine . . . Roll not removed in changing felts . . . Rear suction eliminates "make" and "break" of suction connections . . . No drive required . . . No maintenance other than occasional oiling . . . The Downingtown Mfg. Co., Downingtown, Pa.

KEEP YOUR FELTS CLEAN WITH A SUCTION ROLL

Alexander Thomson Visits Mexico

DAYTON, Ohio, February 18, 1935—Alexander Thomson, president of the Champion Coated Paper Company, Hamilton, left Thursday evening last for Mexico—an indefinite destination. No announcement had been made by Mr. Thomson relative to his plans, but it was learned that the purpose of his trip principally is to contact large paper dealers in and near Mexico City, and to find additional outlets for products of the Hamilton paper company, the largest of its kind in the world.

The Champion mills have been running without interruption during the period of depression. At times notable improvements in mill equipment have been made, and the personnel always has been kept up to the maximum, with few exceptions.

Mr. Thomson, who is president of the Ohio Chamber of Commerce, and who has been interested the past two weeks in bringing to a successful conclusion a campaign for more members and more funds for the Hamilton Y.M.C.A., also is president of the Hamilton Chamber of Commerce. He was elected vice-president of the Hamilton Y.M.C.A. last week.

On his trip to Mexico he was accompanied by Mrs. Thomson. He did not anticipate being absent more than two weeks when he left Hamilton.

Marathon Officials Win Reduction

After a two-year fight led by Ben Metternich, manager of the Marathon Paper Mills Company branch at Ashland, Wis., that city is to have a reduction in freight rates approximating 40 cents per hundred pounds. The Interstate Commerce Commission finally has issued an order giving manufacturers at Ashland the advantage of rail-lake freight rates from and to the east. The order becomes effective March 20, 1935. Shippers have been up against a discriminatory situation, due to higher rates than were enjoyed by shippers in cities further south in Wisconsin, and other cities along Lake Superior, including Superior and Duluth. This discrimination is now removed. Officials of the Marathon company appeared before the commission to point out the necessity for equitable rates.

Celotex Co. Acts on Listing Status

At a special meeting of directors of the Celotex Company the proposal to remove the company's stock from the Stock Exchange was side-tracked by appointment of a committee to report on the status of the shares listed on the exchange.

B. K. Edwards of Chicago and A. E. Black of St. Louis, were elected directors. B. G. Dahlberg, president, was authorized to file an answer for the management consenting to reorganization proceedings now pending in the United States District Court of Delaware, under section 77-B of the bankruptcy act.

Develops New Ivory-White Shade

After extensive research the Holyoke Card and Paper Company, Springfield, Mass. has developed an Ivory-White shade in Kroydon Cover without sacrificing any of the well known Kroydon strength and non-soiling characteristics. This shade provides an excellent background for halftones, and this quality in addition to the "work and turn," strength, and non-soiling features of the stock, promise to make it a very popular item in the Kroydon line. All of the major Kroydon distributors are now stocking Ivory-White.

Eaton Paper Co. Elects Officers

Stockholders of the Eaton Paper Company have effected a reorganization. Col. William H. Eaton, who succeeded his father, the late A. W. Eaton, founder of the company, as president, has been made chairman of the board, succeeding his father. Horace W. Davis succeeds Col. Eaton as president. Paul E. Burbank, sales manager, was elected vice-president; John R. Tobey was reelected treasurer and clerk, and Harold M. Rice, assistant treasurer.

Moore & White Co. Elect Officers

The Moore & White Company, manufacturers of papermaking machinery, Philadelphia, Pa., recently elected the following officers to serve for the ensuing fiscal year and until their successors qualify: J. Atwood White, president; Conrad J. Kern, vice-president and general manager; Thomas B. Gibb, Esq., treasurer; Charles H. Prenzel, secretary; W. E. Schoenly, assistant treasurer, and Wm. S. Blessing, assistant general manager.

Bagley & Sewall Elect Officers

WATERTOWN, N. Y., February 16, 1935—Charles W. Valentine was re-elected president of the Bagley & Sewall Company at the annual meeting this week. Other officers re-elected included the following: Edward S. Lansing, vice president in charge of sales; Clarence E. Kinne, vice president in charge of engineering; Harry C. Kinne, secretary, and Carroll L. Thompson, treasurer.

Georgia Votes Paper Mill Tax Exemption

ATLANTA, February 16, 1935—Aimed to further the development of the pine-paper industry in this State, a proposed constitutional amendment has been passed by the Georgia Senate exempting Georgia pine paper pulp industries from taxation for fifteen years. The proposed amendment now must be approved by the House and ratified in the 1936 general election to become effective.

S K F Opens Minneapolis Office

S K F Industries, Inc., announce the opening of a new branch store at 407 South 4th street, Minneapolis, Minn. Mr. A. Kishkunas is in charge.

The new office carries a complete stock of S K F Ball and Roller Bearings, Pillow Blocks, and Hangers to meet the rapidly increasing demand for an overnight bearing service.

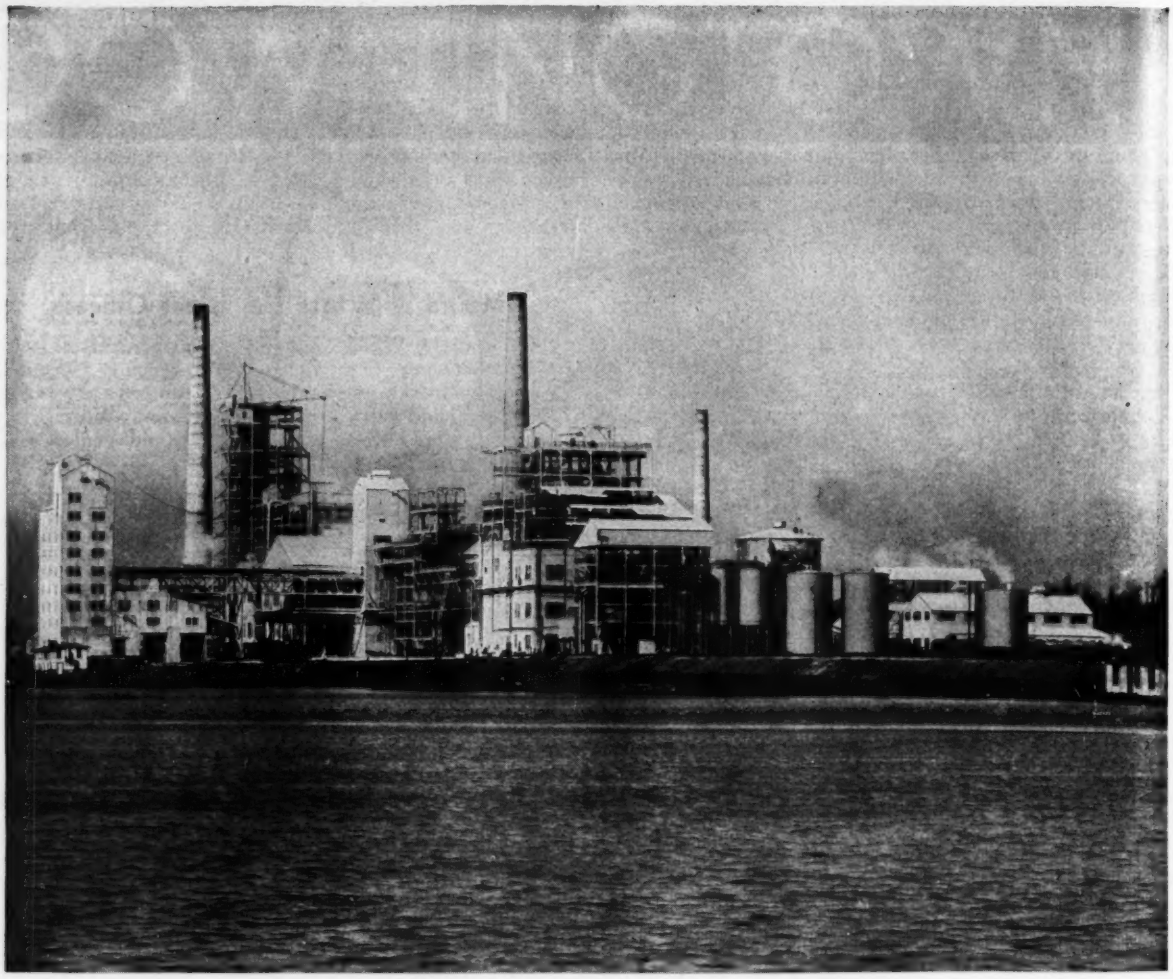
Celotex Co. Gets Trustees

WILMINGTON, Del., February 16, 1935—Colin C. Bell of Wilmington and William Tracey Alden of Chicago, receivers for the Celotex Company, were named trustees by Federal Judge John P. Nields today.

The management of the Company, which is undergoing reorganization, recently consented to appointment of trustees.

Storrs & Bement Co. Elects Officers

At a stockholders' meeting of Storrs & Bement Company, Boston, Mass. held recently, Wm. N. Stetson, Jr., was elected president and treasurer; E. L. Cummings, vice-president; J. H. Brewer, vice-president and general manager, and R. B. Nichols, assistant treasurer.



New Mathieson Plant at Lake Charles, Louisiana

LAKE CHARLES—A New Source of Alkali

AT Lake Charles, Louisiana, the Southwest now has its own alkali supply. Effective February first, Mathieson's new Lake Charles Plant started regular shipments of alkali to consumers in this growing industrial area.

As a dependable source of supply, the Lake Charles Plant is unique in many respects. The plant itself is of advanced design, including a number of engineering features embodied in such a plant for the first time. Its location is particularly favorable both from the standpoint of ample supplies of raw materials and of distribution facilities for the finished products.

Radiating out of Lake Charles are the lines of three great railroad systems—the Southern Pacific, the Kansas City Southern and the Missouri Pacific. The fast freight schedules from Lake Charles, maintained by these carriers, permit timing of deliveries in *hours* rather than days, even to points such as St. Louis and Kansas City.

In addition to speedy rail delivery service, the new Lake Charles Plant offers substantial savings in transportation costs both by rail and by water to consumers in the South and Southwest, and by water to points on the Atlantic and Pacific seaboard, along the Gulf Coast, and on inland waterways including the Mississippi River and its tributaries. Water shipments are loaded on steamers and on barges at our own plant docks at Lake Charles.

We shall be glad to discuss with consumers the advantages of Lake Charles as a source of supply of alkali—in carloads, trainloads or shiploads.

Mathieson Chemicals

© THE MATHIESON ALKALI WORKS (INC.) . . . 60 EAST 42ND STREET, NEW YORK, N. Y.

Technical Association Holds Annual Meeting

Twentieth Annual Convention at the Waldorf-Astoria, New York, February 18-21, Is Big Success in Every Respect—Reports Show Organization Is In Sound Financial Condition Constantly Gaining in Usefulness and Membership

The twentieth annual convention of the Technical Association of the Pulp and Paper Industry, held at the Waldorf-Astoria Hotel, New York, February 18-21, was the most largely attended and doubtless the most successful meeting in every respect in the history of the organization. Technical men from all the representative paper making centers of this country and Canada were present and participated actively in the splendid program from the opening meeting on Monday until the closing luncheon on Thursday. At this latter function the TAPPI medal was presented to Edwin Sutermeister for his outstanding contribution to the technical development of the pulp and paper industry. Clark C. Heritage, president of the association made his opening address as follows:

The President's Address

The president of the Technical Association of the Pulp and Paper Industry, according to the Articles of Organization, is instructed to present at the annual meeting, an address discussing such subjects as are of value to the association. The presentation of an address is a fairly simple matter, but to be charged with the discussion of subjects of value is a more serious undertaking.

TAPPI About to Become of Age

FIRST. I want to call your attention to the fact that this is the twentieth annual meeting of the association. If I may draw a comparison with the life of an individual, we as an association, have passed through the period of a rapid growth from a handful of charter members to a body of 1,200 members, and are now about to become of age. Our character has largely been formed, our ideals are well established. We are entering the period in our association life when the combination of physical vigor and mental keenness accruing from these twenty years will permit us to undertake a man's work and do it well. We have hardly scratched the surface of the fields of service in which we may function. If we continue to build wisely and carefully, yet prosecute our association work with imagination, with diligence and with perseverance, the extent of our service to our industry and ourselves as our factual knowledge grows, need know no limits.

First Year of Operation Under the Code

SECOND. A word with respect to the conditions in our industry during the year just past as affecting the technical man, may possibly be of value. The year 1934 was the first year of operation under the Code of Fair Practices. Cooperation in many activities and great improvement in internal relations had their beginnings. Honest differences arising in both technical and non-technical phases were brought out in the open to be thoroughly discussed if not always satisfactorily settled. To quote Mr. Charles W. Boyce, who has played a major part in the development of the self-government of our industry, "Manufacturers learned in the battles of the depression years, that the interest of one is the interest of all, that there can be no profit if the industry itself is not profitable. Warfare has given way to arbitration, men have been put to work, wages increased, and prices stabilized."

Activities More Orderly

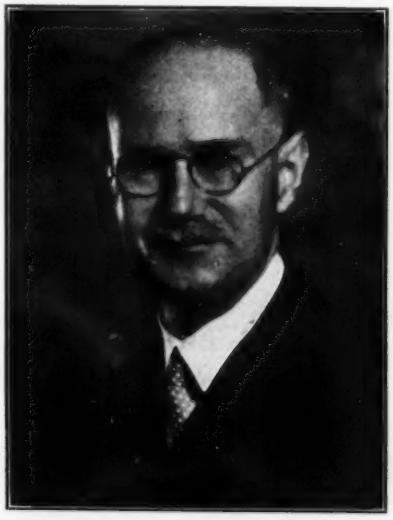
The general result of these happenings so far as the individual technical man is concerned, is that his activities though no less strenuous and exacting, have perhaps become more orderly, less hectic and less chaotic compared to 1933.

Price stabilization has of necessity given considerable impetus to the grading of papers corresponding to the price structure. This has accentuated the importance of paper quality and uniformity as purchasing criteria, so that the paper market generally speaking, has become quality conscious to a considerably greater extent than formerly. We find reference in the grading structures of the various divisions which have undertaken grading in some form or other to such properties as brightness, bursting strength, tearing strength, formation, glare, and resistance to water penetration, together with almost universal use of furnish limitations with respect to the broad classes of papermaking fibers. With certain of the more obviously important properties located as to value by a grading structure and with furnish limitation imposed, emphasis shifts to process variables and their effects upon properties not included in the grading structure.

Technical activities have been greatly influenced by these trends and more and more emphasis has been placed on technical sales development with improvement in quality and uniformity of product.

The Cost of Manufacture

Although the general trend in the industry in 1934 has without doubt been the raising of quality to the greatest



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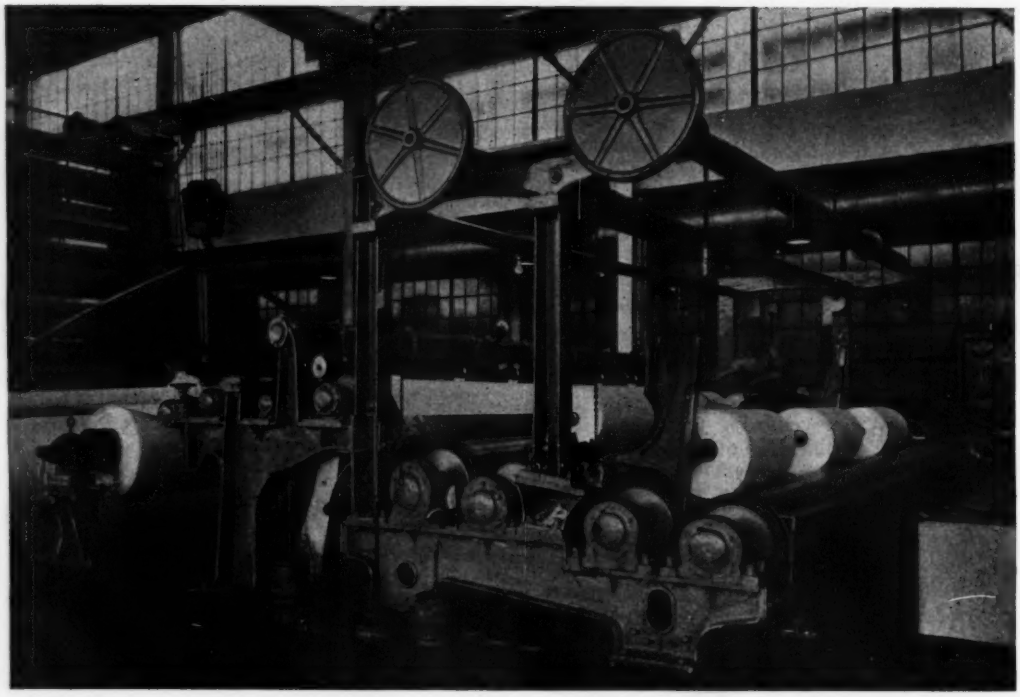

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degree allowable under the particular grading in force which has been actuated largely through the industry operating far below its rated capacity yet, there is fortunately a counter stabilizing influence upon excessive sales development and uneconomic quality competition. That is the cost of manufacture. As earnings diminish due to the struggle for attractive quality in a decided buyers market, the emphasis must shift to a more sensible attack, namely, the maintenance of quality with cost reduction. Price standardization gives additional incentive to this phase of technical work because profit is now more than ever dependent upon the cost of production. With any reasonable earnings available, mill improvements may be made to effect further cost reduction so that as technical men, we may reasonably look forward to a more balanced condition in the problems we face with less emphasis upon large gains in quality and more emphasis upon manufacturing cost and physical mill improvement. As individuals, we are faced in 1935 with the proposition of maintaining our competitive position both with respect to cost and quality. Previously one could specialize in either direction. In the future one must be expert simultaneously in both. The work of the association will be all the more valuable to its members and to the industry; more members will realize this fact and activities and results will develop in proportion to this interest.

To return to the matter of grading, Mr. Ernst Mahler, Chairman of the Central Grading Committee, will speak to us at our luncheon on Thursday on "The Present Status of Grading." The Technical Association as such has not played a major part thus far in the grading work of the industry although it has offered full use of its facilities. On careful analysis, this is quite understandable and no doubt a wise course to be pursued at this time. The grading of paper appears to not be synonymous with the preparation of property specifications based on use requirements. It is rather a continuous workable compromise involving elements of production, selling, consuming and marketing, where problems of policy may quite rightly outweigh purely technical considerations. It is well for TAPPI to continue its present position of willingness to assist in any way that its resources and organization may be of value.

Financial Condition Sound

Now let us turn our attention briefly to strictly Technical Association matters. Our secretary has reported in detail upon the 1934 performance which can be summarized in a few sentences. Our financial condition is sound as usual, and although our association is not a business organization, it is operated on sound business principles. Our membership is growing slowly but satisfactorily. Our service activities are in strong and capable hands. Our sections have all been visited during the year by one or more of the national officers and are in excellent condition.

In order that this address might not present the ideas and judgments of but one person, your president recently undertook correspondence with the executive committeemen, the divisional chairmen and the section chairman seeking criticisms and suggestions with respect to the association. I can give only a partial cross-section of this correspondence in the time available. Commendation was quite general and is well summed up in this statement from one of the division chairmen:

"The fact that TAPPI has been able to hold its ground, continue to turn out a large quantity of work, continue to expand during the last five uncertain years indicates beyond doubt, its recognized value to members and to the industry. The challenge is to maintain this standing with a forward looking program."

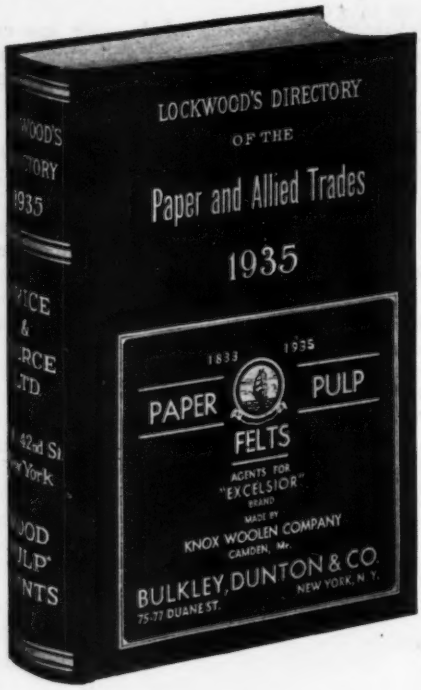
Let us then discuss our program briefly with less emphasis upon what we have accomplished and more upon what we intend to accomplish, constantly bearing in mind that the major theme of our association is service.

By far the most important element in the program is the work of our committee organization. In the words of one of the section chairmen: "The life of the association is lived largely in its committee organization. The activities of the committees to a very large extent determines the usefulness of the association to its members and to the industry. As members can be made to appreciate the service to themselves and to the industry which is possible through such organization, then will the Association serve and prosper most."

Giving Generously of Time and Energy

Those of us who have had our fingers on the pulse of the committee work for the last four years appreciate the growing vitality of this part of our organization. The seven divisional chairmen, thoroughly capable and enthusiastic, are giving generously of their time and energy. Together with the vice president, they have recently been organized into a Planning Board to meet three months prior to our association meetings to plan each session in detail. If you find this meeting of the association to be of improved quality, the credit belongs largely to this Planning Board. Among the committee chairmen there are a great many who are leaders in their fields and who are filling their positions in the committee organization with great credit to themselves, and to the Association—too many to attempt individual mention. The same holds true of the committeemen themselves. For 1935 let us continue to strengthen our committee organization, to improve the performance of each committee by more careful planning—with more interested and vigorous committeemen straining at the leash to go places. We can accomplish collectively what it would be impossible to accomplish individually, but the total accomplishment is only as great as the individual effort. As you attend the sessions, study the Association Papers, use the bibliography, employ the standards, read the Development Reports, bear in mind that some member or group of members has burned the midnight oil for your benefit. The money you

CLARK C. HERITAGE, President



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pay for annual dues does not produce any of these services. They come into being because someone is willing to contribute his own personal resources for the common good. Every technical man in the industry knows how hopelessly inadequate our fund of technical information is. The door is wide open for every committee.

I do not want to leave the impression that this committee work is entirely a philanthropic activity. It most certainly is not. It provides the opportunity for every member to become known through writing, speaking and entering into discussions and thus to grow in professional experience which we all know, brings its own rewards.

Reports of Outstanding Merit

Several of the committee development reports this year deserve particular mention because of their outstanding merit. The comment of one of the divisional chairmen speaking of one of these reports is as follows: "It is the most complete report that any TAPPI committee has presented to date and shows a very thorough study of the new things in this particular field. There is no question in my mind that this study is many times more valuable to this committee chairman and his firm than it can possibly be to anyone who reads it, meritorious as it is. The more we can convince the executives of our industry that TAPPI committee work will result advantageously to themselves, the more will we strengthen our committee work."

With respect to our Manual of Standards, favorable comment comes from all sides with the further word to push it forward with as much speed as is compatible with quality and accuracy. Our plans for 1935 provide that each committee shall produce at least one standard method, practice, or specification. And concerning specifications, much more emphasis will be placed on this phase of our standards work during 1935, particularly as regards raw materials. Assistance in revising three volumes of the textbooks will be a major phase of committee work in 1935.

A real need has developed in connection with committee work for research assistance financed by the Association. This brings us to the next subject to be discussed.

Cooperation With Other Institutions

One of the fields of service to the industry and to the members in which TAPPI must function to a much greater extent in the future than in the past, lies in intensive cooperation with those research and educational institutions which deal particularly with the subjects of fibrous raw materials, pulps, papers and paper products. It is to these centers of study and training that we must look not only for our technical recruits, not only for much of our scientific factual knowledge, but what is far more important, for leadership in those spiritual attributes of vision, imagination, scientific curiosity, and mental dissatisfaction with the present state of technical affairs which will assure our industry steady and continuous technical progress. The rank and file of us, constantly embroiled in fighting the daily battles of operation, production, quality, cost, merchandising and management, but look to these centers for stimulation. It is with a great deal of pleasure then that I am able to announce that the executive committee has authorized in the 1935 Budget of the Association, a modest sum of $3,000 as a beginning to be expended for educational cooperation, the exact plans to be worked out by a special committee. By this action we are able to assist the student to secure his training, the association and the industry to acquire new knowledge. the committee to carry forward its program, and the school to increase its graduate education.

Paper Educational Facilities

In view of this plan, it is of interest to touch very briefly upon the present activities of these various research and educational institutions which deal particularly with the fields of pulp and paper. Beginning in the East and moving westward, there is the University of Maine, said to be the first university in the United States to give instruction in pulp and paper technology, started in February, 1913, as a branch of the Chemical Engineering Department. Last year this activity became an independent department known as Pulp and Paper Technology. Graduate work is under way both in paper making and in certain fields of converted paper products.

Next toward the West is Massachusetts Institute of Technology with one of the stations of its School of Chemical Engineering Practice, located at the Eastern Manufacturing Company in South Brewer, Maine, where at this particular time, research is going forward on the measurement of vapor pressures of sulphur dioxide over cooking acid at temperatures and pressures met in digester practice.

Next there is the New York State College of Forestry at Syracuse, N. Y., where particular attention is being given to bleaching problems with respect to the influence of pH and accelerators, to the variables of test sheet formation and the chemical composition of American species employing the most modern methods and technique.

Dropping South for a moment there is the Pulp and Paper Laboratory of the Industrial Committee of Savannah, which is engaged in a wide variety of studies of the utilization of Southern species both long and short fibered, ranging with respect to products from mechanical pulp at one end through newsprint, book, bond, and coated to silk at the other end. Recent additional equipment includes a silk laboratory, a coating machine and a supercalender.

In Washington, the national Bureau of Standards is prosecuting its researches further on the stability of rag content papers, the printing performance of offset papers, and improved instrumentation in the fields of air permeability, opacity and light reflection.

Continuing our journey westward, the Department of Chemical Engineering of the University of Michigan is conducting graduate research in the fields of pulp and

R. G. MACDONALD, Secretary

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paper drying with respect to the mechanism of this unit process particularly as affected by the process variables; and in the field of soda pulping from the standpoint of predicting yields and quality both with respect to delignification and cellulose decomposition.

In Wisconsin, there are two well-known educational and research centers. The Institute of Paper Chemistry, active in many fields of both fundamental and applied research which include the development of suitable instruments and methods for the evaluation of important paper properties and such other diverse subjects as sizing, fillers, coloring, sulphur burning, pulping and fiber identification.

At the Forest Products Laboratory in cooperation with the University of Wisconsin, work is proceeding along the lines of identifying and dealing with those chemical compounds in wood and pulp which degrade color and interfere with bleaching; and along the lines of integrating, the production of semi-bleached sulphate and groundwood from pine for the manufacture of coarse papers. The research facilities in the new building have been greatly expanded both with respect to digesters, paper machine and grinder.

Still farther West, at the University of Idaho attention is being directed to researches on ammonia base sulphite pulping of white fir, on the chemistry of lignin and further utilization of logging and mill wastes.

Finally, at the University of Washington, the utilization of Douglas fir by an ammonia base sulphite process is being worked out as are also various phases of waste sulphite liquor utilization from both the disposal and the by-product viewpoints.

It is obviously not possible to give this subject adequate attention in such a very brief resume and in all probability it is quite incomplete. For example, both Columbia University and the University of Alabama are known to be active in this field. The purpose in presenting the picture is to point out to the Association the unusual opportunity which the Association has for service to itself, the industry and the schools in this field. The development report of the chairman of the Research and Development Division will cover this matter in much greater detail.

Publication Activities Commended

The publication activities of the Association generally received commendation, with suggestions toward a more rigid editorial policy. Our future plans involve publishing the second bound volume of the Collective Bibliography covering the period 1929-1935 inclusive. We feel we are not far from our goal of publishing an Annual Survey of progress in the paper industry, to consist essentially of a compilation of the development reports of the various committee chairmen. We expect to publish our first TAPPI monograph in 1935 entitled, "The Relation of Fiber Properties to Sheet Properties."

The formation of local sections is generally conceded to have been one of the best moves the national Association ever made. The five existing local bodies are putting on programs and attaining an exchange of knowledge and good will among their members which guarantee their futures. The national Association stands ready to assist them in every possible manner. They are an integral and vital part of the national Association.

Pacific Section Complimented

I can not pass this opportunity to pay our compliments to the Pacific Section who were hosts to the Association at our 1934 Fall Meeting. I need only say to those of the association who could not go to Portland, Ore., that you missed meeting and knowing as fine a group as there is anywhere in the association.

It is given only to the largest and most vigorous of the professional societies to enjoy meetings as truly national in character as this one was.

Announcement of the 1935 Meeting

The fall meeting in 1935 will probably be held at Atlantic City, the Delaware Valley Section of TAPPI being our host.

I have left mention of the most important benefit to the individual through membership in TAPPI until the last, that it may carry the greatest emphasis. This benefit is called by various names, human relations, personal contacts, the opportunity to spend the days with congenial companions, the opportunity to increase and strengthen personal friendships, the opportunity to give and receive honest opinions, and judgment, the opportunity to know "Bohemia Hall."

The Technical Association provides the medium for personal contact between the managers, operators, engineers, chemists, technologists and buyers of the industry, the technical men of allied industries, and of the converters and consumers. It is a wise man who takes full advantage of these contacts.

The opportunity twice each year to get new vision, new lines of thought, new answers to old problems alone, is ample pay for whatever work and expense goes along with membership in TAPPI.

The Executive Committee extends a hearty welcome not only to members but also to other than TAPPI members with the hope that each will have established during these sessions a connection which he will wish to maintain.

R. G. Macdonald, secretary-treasurer of the association presented his annual report as follows:

Report of the Secretary-Treasurer

The year 1934 may be considered as a recovery year for the Technical Association. Although the association, as such did not suffer very much during the years of industrial depression its growth was restrained somewhat and the excellent progress that was made was accomplished in the face of many difficulties.

Membership

The gain that was made in membership was brought about by the return of many who had found it necessary to drop out temporarily for financial reasons. Attributing factors to the net growth were the TAPPI Standards and local section activities.

In 1934 there were 135 members elected and 63 resigned or dropped from the membership. On December 31, 1934 the total individual membership was 1127.

There were corporate members and contributing members added. The corporate membership on December 31 was 66 and the contributing membership 48.

The companies that became corporate members were:

J. P. Lewis Company
Hartford City Paper Company
Union Bag and Paper Company
Owens-Illinois Glass Company
Oji Paper Company, (Japan)
Soundview Pulp Company
Weyerhaeuser Timber Company
Munising Paper Company
Gair Cartons, Inc.
Cartiere Burgo (Italy)

The companies that became contributing members included:

Krebs Pigment and Color Corporation
J. de la Roza Company

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Noble & Wood jordans are running in mills making every kind of paper from news or roofing to the finest bonds and book papers.

The Bull Dog, a solid sharp taper jordan is in use in practically every felt and roofing mill in the country. It's a heavy duty jordan especially designed for rag stock and other tough furnish where sharp taper and cutting action are essential.

Noble & Wood jordans can be furnished with either plain or anti-friction bearings, belt driven or direct connected to motor. Plugs are either banded or bandless type.

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- Mammoth
- Mammoth Jr.
- Monarch
- Pony Monarch
- Bull Dog
- Baby (Laboratory)

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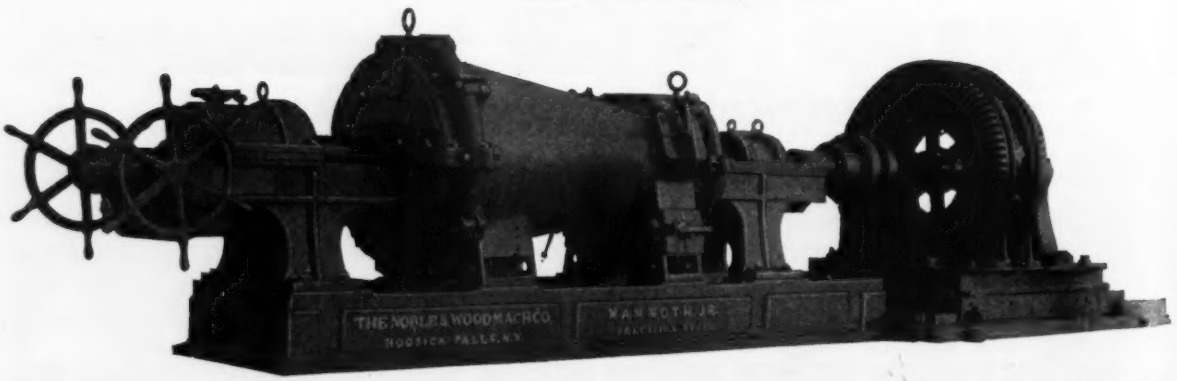
Hoosick Falls, N. Y.



National Aniline and Chemical Company
The Dorr Company
Glidden Company
E. I. du Pont de Nemours Company
Bagley & Sewall Company
E. D. Jones & Sons
Simonds Worden White
Clinton Company
Stein, Hall & Co.
Corn Products Refining Company
Eastwood-Nealley Corporation
The following companies joined in 1934 for 1935:
Mathieson Alkali Company
American Brass Company
Electro-Bleaching Gas Company
A. M. Meinche Company
Crane Company.

Necrology

The Association lost through death the following members in 1934:

W. A. Gocke, R. B. Hansen, C. A. Eurenius, R. M. Snell, A. A. Tanyane.

Special Reports on Manufacturing Problems

From time to time inquiries are received by the Association which are of such a nature that the opinions and advice of a large number of individuals is essential. When these responses are received they are sent not only to the original inquirer but also to everyone who submitted information and to the company members who contribute generously to the support of the organization. The collective responses were issued in the form of the following Special Reports in 1934.

No. 206—Checking of 36 Point Blanks
No. 207—Sticking of Paper to First Press
No. 208—Fading of Bleached Sulphite
No. 209—Grainy Edges of Paper
No. 210—Intermittent Sizing Difficulty
No. 211—White Water in First Wire Shower on Book Paper Machine
No. 212—Pinholes in Light Weight Papers
No. 213—Static Electricity in Paper
No. 214—Operating Factors Affecting Folding Endurance
No. 215—Corrosion in Groundwood Pulp Mill
No. 216—Curling, Warping and Sizing Box Board
No. 217—Trade Names and their Significance
No. 218—Significant Sheet Properties and Paper Specifications
No. 219—Changes in Absorbency Properties of Sulphite Pulp
No. 220—Washing Felts on a Paper Machine
No. 221—Bronzing of Greeting Card Stock
No. 222-C4—Siphons vs Buckets for Water Removal from Drier Rolls
No. 223—Damp Patches in Manilas and Patent Coated Papers
No. 224—Felt Hairs on Sheet
No. 225—Tub Size Press Roll to get Cockle
No. 226—Trade Unions and Employer-Labor Relations
No. 227—Paper Coating Mfg. Problems
No. 228—Machine Speeds for Sulphite Papers
No. 229—Packaging of Bond Papers
No. 230—Weight Tolerances for Bond Paper
No. 232—Trimming Soft Papers
No. 237—Sticking of Glassine to Top Roll of Supercalender
No. 238—Thickness Control for Paperboard

Services to Members and Employment

The association was quite successful in aiding its members to secure employment. The Secretary gave first consideration during the past few years to promote the use of his office as an employment clearing house. This is for the use of the entire industry and most companies needing managers, engineers, chemists or superintendents now make inquiries directly to the association. This service will be continued in the future.

Fall Meeting

The 1934 fall meeting was held at Portland, Ore., on September 10-13. About 700 attended. A complete report of this meeting appeared in the PAPER TRADE JOURNAL of September 20, 1934. It was the best attended and most elaborate convention ever held by the Association. About 100 traveled on the special Northern Pacific train from Chicago. H. Robert Heuer, General Chairman of the Convention and his enthusiastic coworkers did an excellent job for TAPPI.

Publications

THE PAPER TRADE JOURNAL continues to be the official medium for publishing papers presented at the various meetings, national and local, of the Association. The Association is much indebted to George S. Macdonald, publisher and Henry J. Berger, editor of that excellent publication for the unstinted cooperation they have given to the Technical Association.

The Lockwood Trade Journal Company has kindly supplied the preprints for both the annual and fall meetings and in addition, contributed $500.00 toward the publishing of Technical Association Papers. The cover stock of this volume was furnished by the Bogalusa Paper Company.

The Annual Bibliography and Patent List was prepared by C. J. West of the National Research Council and was issued in March.

The Year Book for 1934 was published in September and contains a list of members' reports of local section meetings, list of Standards and Special Reports and much other information dealing with Association activities.

TAPPI Standards, the loose leaf manual which was issued in 1933 has been well received by the industry and has helped to build up the membership and to prevent resignations. The Association sends new and replacement sheets of Standards to its members and will continue to do this. The existence of this manual is doing much to bring about universal acceptance of testing procedures.

The TAPPI Education Committee in cooperation with the Federal Board for Vocational Education completed the preparation of an excellent bulletin on Vocational Training in the Pulp and Paper Industry. This Bulletin, No. 168, was printed by the Government Printing Office and is available either through the Superintendent of Documents or the Book Department of the Technical Association. The cooperation of the Federal Board has made possible a thorough investigation and provided for adequate financing of the publications. It is now in its second printing and has been broadly distributed throughout the industry.

A number of members have written books during the year and their efforts have been encouraged by the Association through the publishing of book reviews and promotion of sales.

The test books on the Manufacture of Pulp and Paper prepared by the paper industry in the United States and Canada are now nearly out of print and will be thoroughly revised by TAPPI and the Canadian Technical Section in 1935 and issued as a third revision by the McGraw Hill Publishing Company.

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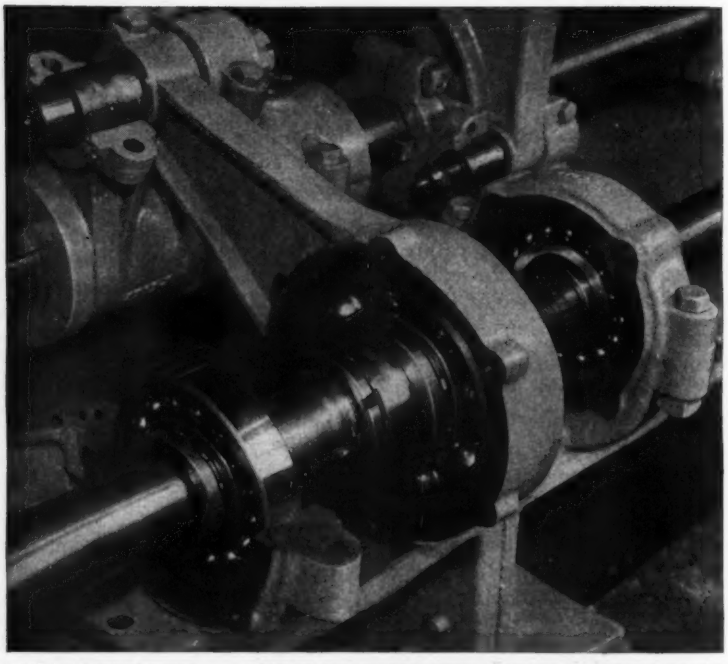

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Cooperative Activities

In response to a request by the Paper Industry the Technical association prepared a plan of organization of the industry to study the paper grading problems. This plan has been largely carried through and an aggressive grading program is now in operation.

The Association is a member of the American Society for Testing Materials and the Inter-Society Color Council. It is represented in the American Pulp and Paper Mill Superintendents' Association, the Canadian Pulp and Paper Association, Technical Section, and the Technical Section of the Paper Makers' Association of Great Britain and Ireland.

With the American Paper and Pulp Association and the Association of American Wood Pulp Importers, it is represented on the Joint Committee on Approved Pulp Testing Chemists and with the A.P.P.A. on the Central Research Committee. With the Canadian Pulp and Paper Association it is represented on the Joint Text Book Committee. It is cooperating with the American Standards Association in the study of lubricants and with the American Oil Chemists Society in the study of soap wrapper paper.

Sections

All the sections have made progress during the year and are attracting competent leadership. It is particularly gratifying to note the increasing number of operating superintendents present at the meetings. A number of meetings were held jointly with local divisions of the American Pulp and Paper Mill Superintendents Association.

One new section was projected, namely the proposed Ohio Section. One meeting was held in November and another this month at the Manchester Hotel in Middletown, Ohio and was very well attended.

The other five sections had very active years, most of them holding monthly meetings.

The Pacific Section, under the chairmanship of Lawrence Killam acted as host to the National Association at its fall meeting at Portland, Oregon. A. S. Quinn of Stebbins Engineering and Manufacturing Company was Secretary. At this meeting, Myron W. Black of the Inland Empire Paper Company was elected chairman, W. R. Barber, Vice Chairman and W. S. Hodges, secretary-treasurer.

The Lake States Section continued its good work with A. T. Gardner of the Combined Locks Paper Company, Chairman; S. D. Wells of the same Company, Vice Chairman; and Roy L. Davis of the Consolidated Water Power and Paper Company, Secretary-Treasurer.

The Kalamazoo Valley Section was guided by C. C. Schneider, Hawthorne Paper Company, Chairman; H. M. Annis, Allied Paper Mills, Vice Chairman; and R. L. Barton, Michigan Paper Company, Secretary-Treasurer.

The Delaware Valley Section continued to hold well attended and successful meetings. Harvey P. Cannon, Container Corporation of America was Chairman; H. C. Schwalbe, Dill & Collins, Vice Chairman; and J. C. Harper, Jr., West Jersey Paper Corporation, Secretary-Treasurer.

The New England Section, Frederic C. Clarke, Skinner & Sherman, Inc., Chairman; H. M. Keating, Vice Chairman; Helen U. Kiely, Secretary; and W. O. Johnson, Treasurer, has shown a considerable advance in attendance and interest in the excellent programs provided.

Divisions and Committees

The efforts on the part of the divisional organization has reflected itself in much better national meetings. Much of the growing prestige of the Technical Association is due to the fine leadership now evident in committee and divisional chairmenship.

Two informal organizations within the association are largely responsible for the improved programs, namely the TAPPI Council and the Planning Committee. Both are made up of divisional chairmen but the former includes the past officers, section chairmen, executive committeemen, and committee chairmen. These organizations meet for the purpose of definitely planning the annual and fall meetings and to discuss the general welfare of the Association.

Personnel changes in the divisional and committee chairmanships will be covered in this report and details regarding progress made by the committees will be left to the reports of the chairmen.

In committee organization, an advance step was taken whereby vice chairmen were appointed for each division and committee. This is expected to promote uninterrupted committee work in the future.

In the Management Division, H. L. Joachim, now with the Longview Fibre Company, was appointed vice chairman to assist W. M. Shoemaker, National Vulcanized Fibre Company.

L. J. McNamara, Wisconsin Vocational School, was appointed vice chairman of the Education Committee to assist H. G. Noyes, Oxford Paper Company, chairman.

Following the loss through death of R. M. Snell, R. S. Kellogg of the News Print Service Bureau was appointed chairman of the History and Biography Committee.

H. H. Hanson, W. C. Hamilton & Son, succeeded H. L. Joachim as chairman of the Management Methods Committee; and B. M. Thomas, Container Corporation of America was appointed Vice Chairman.

H. W. Richter, George O. Jenkins Company, was appointed vice chairman to assist C. W. Rivise, Caesar & Rivise, Chairman.

L. M. Booth, Booth Chemical Company was appointed vice chairman of the Waste Committee to assist C. M. Baker, Chairman.

In the Engineering Division, H. J. Buncke, Oxford Paper Company was appointed Vice Chairman to assist M. H. Teaze, Hardy S. Ferguson Company, Chairman.

S. W. Fletcher, J. O. Ross Engineering Company, was appointed vice chairman of the Equipment Committee to assist Frederick Wierk, Johnson & Wierk, Inc., Chairman.

A. E. Montgomery, J. O. Ross Engineering Corporation, was appointed vice chairman of the Heat and Power Committee to assist A. G. Darling, General Electric Company, Chairman.

James Rogers II, J. J. Rogers Company, was appointed vice chairman of the Materials of Construction Committee to assist J. D. Miller, York Haven Paper Company, Chairman.

In the Raw Materials Division, John Traquair, Mead Corporation, was appointed vice chairman to assist John L. Parsons, Hammermill Paper Company, chairman.

Helen U. Kiely was appointed vice chairman of the Fibrous Raw Materials Committee to assist John Traquair, chairman.

G. H. Chidester, Forest Products Laboratory, was appointed vice chairman for the Non-Fibrous Materials Committee to assist C. E. Peterson, Riegel Paper Corporation, chairman.

In the Operating Division, W. O. Johnson, Strathmore Paper Company, was appointed Vice Chairman to assist Frederic C. Clark, Skinner & Sherman Inc., chairman.

F. W. Motschman, Continental Paper and Bag Corporation, succeeded C. J. Christiansen, Fibre Making Processes,

● The most accurate measuring and recording control devices aid the workmen in the bleaching plant of the Pulp Division of the Weyerhaeuser Timber Company in maintaining accuracy of processing. This accuracy is reflected in the uniformly high physical and chemical characteristics of Weyerhaeuser Bleached Sulphite.

●

Color WITHOUT Sacrifice OF STRENGTH

● It has long been an axiom in the bleaching of wood fibers that strength is decreased as color is increased. The bleaching process used by the Pulp Division of the Weyerhaeuser Timber Company, however, produces a pulp of uniformly high color without any material loss of strength. This is made possible through gentle fiber treatment in controlled multiple stages without drastic chemical or thermal action.

WEYERHAEUSER
••
STANDARD

PULP DIVISION

WEYERHAEUSER TIMBER COMPANY

LONGVIEW, WASHINGTON

Inc., chairman of the Preparation of Fibrous Materials Committee.

C. M. Connor, Glassine Paper Company, was appointed vice chairman of the Preparation of Non Fibrous Materials Committee to assist H. C. Schwalbe, chairman.

M. P. Chaplin, Keyes Fibre Company, succeeded W. J. Garding, Watab Paper Company as chairman of the Mechanical Pulping Committee and W. E. Brawn, Pejepscot Paper Company, was appointed vice chairman.

P. A. Paulson, Appleton, Wisconsin, succeeded Vance P. Edwardes as chairman of the Acid Pulping Committee. Two subcommittees were found representing West Coast and Eastern practice. W. N. Kelley was appointed vice chairman of the Pacific Subcommittee and W. H. Swanson, Kimberly-Clark Company, vice chairman of the Eastern Subcommittee.

G. H. Tomlinson, Howard Smith Paper Mills, was appointed vice chairman of the Alkaline Pulping Committee to assist H. R. Murdock, Champion Fibre Company, chairman.

G. Lamont Bidwell was appointed vice chairman of the Stuff Preparation Committee to assist D. Manson Sutherland, Jr., chairman.

The Paper Manufacture Committee of which Frank E. Ladd, Keith Paper Company, is chairman was divided into three subcimmittees to deal with Fine Paper, Coarse Paper and Cylinder Paper. The vice chairmen appointed were Donald Appleton, Champion International Company, George D. Bearce and Ralph Wilkins, Bird & Sons, respectively.

L. Werden, Peninsular Paper Company, succeeded H. R. Harrigan, District of Columbia Paper Manufacturing Corporation, as Chairman of the Finishing Committee and V. F. Waters, Wrenn Paper Company, was appointed vice chairman.

In the Research and Development Division, D. W. McCready, University of Michigan, was appointed vice chairman to assist C. E. Curran, Forest Products Laboratory, chairman.

A. Papineau-Couture, Montreal, was appointed vice chairman of the Abstracts and Bibliography Committee, to assist C. J. West, National Research Committee, chairman.

R. H. Doughty, Fitchburg Paper Company, was appointed vice chairman of the Paper Use Requirements Committee to assist P. K. Baird, Forest Products Laboratory. H. F. Lewis continues as chairman of the Fundamental Research Committee.

In the Testing Division, W. A. Chapman, Skinner & Sherman Inc., was appointed vice chairman to assist Roger C. Griffin, A. D. Little, Inc., chairman.

J. S. Martin, Forest Products Laboratory, was appointed vice chairman of the Fibrous Materials Testing Committee, to assist M. A. Youtz, Northern Paper Mills, chairman.

R. H. Wiles, International Paper Company, was appointed vice chairman to assist H. W. Morgan, Institute of Paper Chemistry, chairman.

J. d'A Clark, Scott Paper Company, was appointed vice chairman of the Paper Testing Committee to assist B. W. Scribner, Bureau of Standards, chairman.

J. J. Healy, Jr., Merrimac Chemical Company, was appointed vice chairman of the Non-Fibrous Materials Testing Committee, to assist W. A. Chapman, chairman.

In the Converting and Consuming Division, J. J. O'Connor, Mead Company, was appointed vice chairman, to assist A. W. Nickerson, chairman.

Gerald Haywood, West Virginia Pulp and Paper Company, was appointed vice chairman of the Coating Committee, to assist J. J. O'Connor.

E. N. Wennberg, Continental Diamond Fibre Company, was appointed vice chairman of the Laminating Committee, to assist H. P. Cannon, Container Corporation of America, chairman.

J. D. Malcolmson, Robert Gair Company, was appointed vice chairman of the Container Committee, to assist Pierre Drewsen, Hinde & Dauch, chairman.

Charles Clarkson continues as chairman of the Graphic Arts Committee.

A special Starch Testing Committee was organized and George E. Corson, Clinton Company, was appointed chairman.

A special Color Committee was organized and John L. Parsons, Hammermill Paper Company, was appointed chairman.

A special Public Relations Committee was organized and James A. Lee of Chemical & Metallurgical Engineering was appointed chairman.

Conclusion

The detailed report herein, on committee personnel will illustrate one way in which the association is endeavoring to broaden responsibility and develop leadership of the most competent kind. Since all chairmen are particularly well qualified to hold the positions to which they have been appointed, the association is strengthened by the efforts they make in advancing the art of pulp and paper making.

The chairmen, committeemen and many others have been called on by the secretary many times to help members solve important technical problems. This cooperation has always been cheerfully and efficiently extended and the secretary at this time wishes to extend his personal thanks for the great amount of help he has received. The association is constantly gaining greater recognition as a clearing house for manufacturing and technical information. This has helped very much and the stability of TAPPI during these troublesome years is a testimonial of appreciation on the part of the paper and pulp industry.

Technical Association Officers

The officers of the Technical Assocation of the Pulp and Paper Industry for the ensuring year are as follows:

President, Clark C. Heritage, Oxford Paper Company, Rumford, Me.; vice-president, Grellet N. Collins, International Paper Company, New York; secretary, R. G. Macdonald, 122 East 42nd street, New York.

The members of the Executive Committee include: C. C. Heritage; Grellet N. Collins; Otto Kress, Institute of Paper Chemistry, Appleton, Wis.; W. R. Maull, Dill & Collins, Inc., Philadelphia; E. O. Reed, Crane & Co., Dalton, Mass.; Helen U. Kiely, American Writing Paper Company, Holyoke, Mass.; Henry P. Carruth, Mead Corporation, Chillicothe, Ohio; A. E. H. Fair, Alliance Paper Mills, Merritton, Ont.; Albert Bankus, Crown-Zellerbach Corporation, San Francisco, Cal.; W. J. Lawrence, Paper Makers Chemical Corporation, Kalamazoo, Mich.

R. F. C. Makes Loans to Fifteen Paper Firms

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., February 20, 1935—During the period June 19 to December 31, 1934, the Reconstruction Finance Corporation made loans to 15 paper and allied products corporations amounting to $1,214,350 which was 2.5 per cent of the number made during that time and 3.5 per cent of the total amount loaned during the same period.

U. S. Envelope Co. Makes Good Report

The annual report of the United States Envelope Company shows a net profit of $472,510 in 1934 or about $7.53 a share on outstanding common stock. There are 25,250 shares of common stock outstanding. Semi-annual dividends of $3.50 per share on the preferred stock and $2.50 on the common stock payable March 1 to stockholders of record were declared.

The surplus account Dec. 31, 1934 showed a slight decrease but the assets are figured at $4,460,384 to liabilities of $275,076. Working capital increased the past year from $3,978,337 to $4,185,309. The following is the balance sheet:

ASSETS

Plant Investment	$9,104,086.68
Trade-Marks, Patents and Good Will	123,650.49
Stock, raw, wrought and in process	1,927,911.87
Accounts and notes Receivable	895,925.88
Cash	855,413.94
Certificates of Deposit, United States and Municipal Securities	781,132.82
Miscellaneous Investments	50,111.28
Prepaid Charges: Insurance, etc.	91,479.86
Deferred Assets—Net	73,553.02
	$13,903,265.81

LIABILITIES

Capital Stock, Preferred	$4,000,000.00
Capital Stock, Common	2,625,000.00
Accounts Payable	214,224.83
Reserve for Federal Income Tax	60,000.00
Reserve for Sales Tax and Insurance	851.12
Reserve for Depreciation on Plant Investment	4,709,218.17
Surplus	2,293,971.69
	$13,903,265.81

Net Income for Year Ended Dec. 31, 1934—before Depreciation	$786,710.26	
Depreciation on Plant Investment for Year Ended Dec. 31, 1934	314,199.67	
Profit for Year Ended December 31, 1934—Transferred to Surplus		$472,510.59
Surplus Account, January 1, 1934	$2,355,351.95	
Additions		
Adjustment of Federal Income Tax Reserve for 1933	8,943.15	
Refunded of Import Duties Applicable to Prior Years	402.98	
	$2,364,698.08	
Deduction		
Additional Federal Income Tax for Year 1931	4,178.44	
Surplus Account, January 1, 1934—Adjusted		$2,360,519.64
Additions		
Adjustment of Machinery and Tools	$1,521.10	
Cancellation of Reserve for Unredeemed Bond Coupons	75.00	
Profit for Year Ended December 31, 1934	472,510.50	474,106.69
		$2,834,626.33
Deductions		
Dividends on Preferred Stock Paid on March 1, 1934 (3½%) and Sept. 1, 1943 (3½%)	$280,000.00	
Dividends on Common Stock Paid on March 1, 1934 (2½%) and Sept. 1, 1934 (2½%)	131,250.00	
Credited to Reserve for Federal Income Tax	60,000.00	
Credited to Reserve for Contingencies	69,404.64	540,654.64
Surplus Account, December 31, 1934		$2,293,971.69

Conditioning Lithographic Paper for Offset

In the study of the relation of moisture content of lithographic paper to distortion in multicolor offset prints, the National Bureau of Standards has found in a press room operating at 45 per cent relative humidity, that the moisture content of the paper remained practically constant when the paper was pre-conditioned to approximately 7 per cent above the press room condition. This is an important point in obtaining accurate register of successive prints since it appears to offer a means of avoiding dimension changes in the paper caused by moisture from the wet printing plate. In normal commercial practice, the paper is conditioned to equilibrium with press room air, and water from the plate causes it to expand during the first few printings. By starting the printing with the paper in moisture equilibrium with the higher humidity the loss of moisture caused by the lower press room humidity and the gain of moisture from the press were balanced, and no expansion occurred.

Nils R. Johaneson Reelected President of Association of American Wood Pulp Importers

At the annual meeting of the Association of American Wood Pulp Importers held at the Waldorf-Astoria Hotel on February 7, the following officers were elected for the ensuing year:

President, Nils R. Johaneson, of Johaneson, Wales & Sparre, Inc.

NILS R. JOHANESON

Vice President, Edward E. Barrett, of The Mead Sales Company, Inc.

Treasurer, J. A. Millar, of the Perkins-Goodwin Company.

Secretary, Harry Dixon, of Johaneson, Wales & Sparre, Inc., 250 Park avenue, New York.

Board of Directors, Messrs. Johaneson, Barrett, Millar and Dixon, and Orvar Hylin of the Lagerloef Trading Company, Inc.

National Councillor, Frank C. Overton of Castle & Overton, Inc.

Alternate National Councillor, Carlton B. Overton of Castle & Overton, Inc.

P. H. Glatfelter Co. Entertains

Friday evening, February 8, 1935, the P. H. Glatfelter Company, paper manufacturers of Spring Grove, Pa., entertained at a dinner meeting at the Hotel Harrisburger, Harrisburg, Pa., four of their distributors who cover the Central Pennsylvania area. The guests were the Donaldson Paper Company and Johnston, Keffer & Trout of Harrisburg, the Andrews Paper House of York, and the Antietam Paper Company, Hagerstown, Md., and their sales forces. Approximately 40 attended.

Each of these merchants distribute some or all of the Glatfelter lines of book, bond and mimeograph paper.

During the meeting the improved Glatfelter papers were discussed, enthusiastic comments being made by those present. W. B. Tracy of the Tracy-Parry Company, advertising counsel for the Glatfelter Company, presented an outline of their 1935 advertising campaign that is to be carried on in direct mail, sampling, and trade publications.

Movies of the Glatfelter mill were shown.

Those attending from the Glatfelter Company were P. H. Glatfelter, president; W. S. McClellan, vice-president and sales manager, and C. H. Stallman.

SEND MR. McKITTRICK

Calls like this are typical of the way many concerns turn to EBG in an emergency. They know that EBG service is more than routine. ★ *It is characterized by promptness, willingness, inspired by a friendly interest in the welfare of our customers' business. They know that it can be depended upon to meet out-of-the-usual demands . . . been meeting them since 1909.* ★ *So when help is needed, there's no question of who . . . when . . . where! It's EBG . . . send one of the men.*

ELECTRO BLEACHING GAS COMPANY • MAIN OFFICE 9 EAST 41ST STREET, NEW YORK, N. Y. • PLANT: NIAGARA FALLS, N. Y.

EBG Liquid Chlorine

FIRST IN THE COUNTRY

Heat and Power Production and Transmission*

Annual Progress Report of the Production and Transmission of Heat and Power Subcommittee of the Engineering Division of the Technical Association of the Pulp and Paper Industry

By F. P. Wilmer[1]

This is the third annual progress report. Continuing the policy already established, this report is compiled from reports submitted by representative manufacturers of equipment for the production and transmission of heat and power. The manufacturers' reports have been quoted verbatim in so far as possible.

It is the purpose of this report to include only such outstanding developments in manufacture or in installation as have been made during the past year.

This report is an acknowledgment that the progress of the pulp and paper industry in the production and transmission of heat and power is in large part dependent upon the progressiveness of the equipment manufacturers, on whom it relies to supply its physical equipment.

The Committee desires to take this opportunity to thank those who by submitting their reports have made this consolidated report possible.

It is hoped that this report will serve its purpose of giving to the members of the Technical Association a brief and authoritative resumé of developments in the production and transmission of heat and power this past year.

I Steam Generation

A. Coal Fired Plant.

a. Coal storage, handling and crushing.

The C. O. Bartlett & Snow Company.

With the present tendency to try to cut costs of making steam, the producer is confronted with the abnormally excessive cost of his coal. Since the price of the coal is fixed, the producer can only reduce his costs in other ways among which are the following:

1. Install modern coal and ash handling machinery, reducing power and maintenance.
2. Install a weighing device to check his coal weights.
3. Install equipment that minimizes segregation.

Within the past year we have made an intensive study of the boiler plant coal and ash handling situation with special reference to replacing antiquated systems and the installing of mechanical equipment to replace hand firing.

By standardizing a few sizes of skip hoists and weigh larries and eliminating all complicated machines, we have developed a Centralized System for handling coal and ashes that can be applied with economy to plants even less than 1000 hp. and still perform the various functions now obtained in much larger plants.

Most coal handling systems are rather complicated with no attempt at standardization with the result that the customer pays for an excessive amount of engineering for each installation as well as a special design of boiler plant building to fit.

Our centralized system usually fits as well in an existing building as in a new one.

The Fairfield Engineering Company.

Fig. 1 shows a coal handling installation at the power house of the Wood Conversion Company, Cloquet, Minn., R. D. Thomas, Minneapolis, Minn., Consulting Engineer.

The equipment has a capacity of 20 tons per hour, consisting of an automatically loaded skip hoist, uncounterweighted, with a lift of 102 feet.

The skip hoist is fully automatic. The operator presses the button and the bucket loads from track hopper, as-

Fig. 1

Skip hoist coal handling and installation. (The Fairfield Engineering Co.)

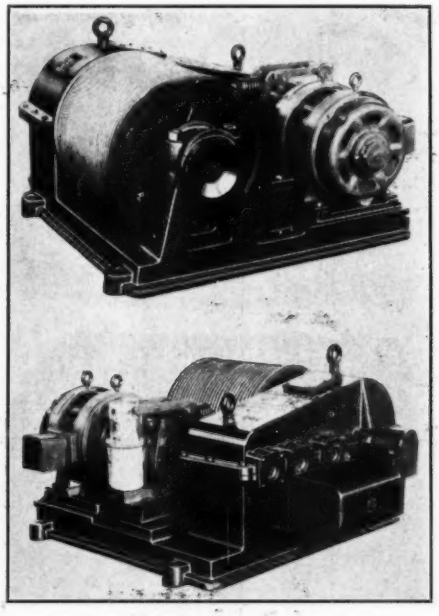


Fig. 2

Skip hoist winding machine. (The Fairfield Engineering Co.).

* Presented at the annual meeting of the Technical Association of the Pulp and Paper Industry, New York, N. Y., Feb. 18 to 21, 1935.

[1] Engineer, The Albemarle Paper Manufacturing Company, Richmond, Va.

ELIXMAN

Straight wound paper cores made in sizes from 2" to 10" inside diameter with any thickness wall required.

Long draw protected slot caps of heavy gauge steel in all sizes.

Heavy duty caps with reenforced square hole. This new patented feature of reenforcement gives added strength and durability.

Samples of caps or cores will be gladly submitted.

ELIXMAN PAPER CORE COMPANY, INC.
CORINTH, N. Y.

cends, discharges into bunker, descends and repeats this cycle automatically until there is no more coal to handle.

The cylindrical bunker is 22 feet 6 inches diameter and has a capacity of 200 tons of coal.

The coal is weighed under bunker by two automatic scales and delivered by gravity through chutes to the two pulverizers.

Fig. 2 covers views of the skip hoist winding machine. This machine is designed for continuous duty with heavy loads, capacities up to 300 tons of coal per hour. The drum is connected to the motor through a train of cut gears. The gear blanks are alloy steel casting. Pinions are cut integral with their shafts from high carbon forged stock. All gears run in oil in a fully enclosed cast iron housing.

The first reduction gear and pinion is herringbone, balance are cut spur. Base is cast iron, one piece, carrying the motor and brake. All bearing pedestals including outboard bearing are cast integral with the base. Roller bearings are used throughout.

Fairfield distributors are designed to prevent the segregation of coal fed to stoker hoppers.

In the operation of modern boilers with high ratings, it is essential that the coarse and fine coal be evenly distributed. If the fuel bed consists of coarse coal at some points and fine coal elsewhere, there will be an excess of air through the coarse coal and a deficiency of air through the fine coal, resulting in an uneven fuel bed and poor combustion.

Uniform distribution of coarse and fine coal will result in higher boiler efficiencies, even combustion and lower maintenance costs with less attention devoted to firing.

With the ordinary round coal spout, it is not possible to obtain an even distribution of coal over a wide stoker grate. The fines are discharged at the middle and the lumps roll to the sides. The same conditions occur when flat fan-shaped spreaders are used. The coal segregates, lumps leaving the natural path of the material down the center of the chute and rolling to the sides.

The efficiency of the Fairfield distributor is due to an ingenious arrangement of fixed internal deflecting vanes. Two series of these vanes are used, diverging and running substantially parallel to the spreading sides of the chute. These, as soon as the chute is filled, form supply channels for multiple small feed streams covering the entire inner part of the chute, which flow under confinement in straight lines to the stoker hopper, without opportunity for spreading.

There is by this method no opportunity for segregation in the spreaders. Coal is delivered across the entire surface

FIG. 3
Non-segregating coal distributor. (The Fairfield Engineering Co.).

of the grates just as it comes from the bunkers, assuring a uniform fire bed and superior combustion without which even the best of fuel or boilers cannot produce maximum efficiencies.

The four sketches, Fig. 3, illustrate the coal flow through the distributors. The first three sketches show the manner in which the distributors fill with coal and the fourth shows the coal movement with the stoker in operation. The internal deflecting vanes definitely control and direct the coal flow and prevent any segregation of sizes.

Fig. 4 shows an installation of coal distributors on new and old boilers at the Fairfield Paper Company, Baltimore, Ohio, Collins Wight, Dayton, Ohio, Consulting Engineer.

Fig. 5 is an exterior view of the coal handling equipment at the Fairfield Paper Company plant. The equipment has a capacity of 30 tons per hour and consists of a track hopper, a reciprocating feeder, a 12 x 7-inch centrifugal bucket elevator 70 feet high and a cylindrical steel bunker, 19 feet dia., capacity 150 tons. Coal is drawn from bunker by a 12-inch screw conveyor, carried inside building and delivered to stokers through the non-segregating coal distributors.

Sauerman Brothers, Inc.

The usefulness of the power drag scraper system of storing and reclaiming coal was enlarged during 1934 by the introduction of the new Sauerman tower scraper storage machine which is designed particularly for coal docks and large storage yards where conditions require the reloading of the stored fuel direct to cars, conveyors, etc.

This new machine features a reloading ramp that is raised and lowered by a hydraulic mechanism. The lower end of the incline or ramp rests on the ground or on the edge of the coal-pile and the upper end is pivoted to the

FIG. 4
Installation coal distributors at Fairfield Paper Co. (The Fairfield Engineering Co.).

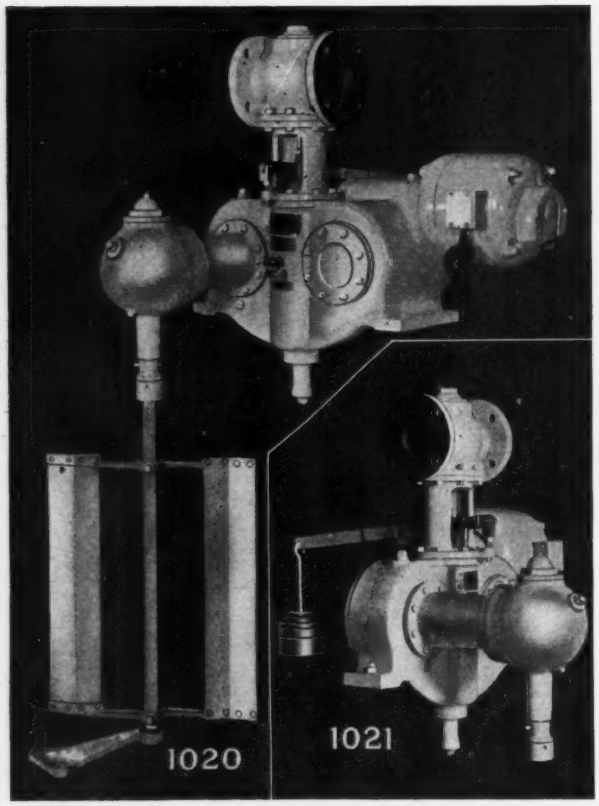
FIG. 5
Exterior view coal handling equipment Fairfield Paper Co. (The Fairfield Engineering Co.).

IT TAKES TIME

to demonstrate the worth of a new piece of equipment and that is literally true of regulating devices which have to deal with many diverse conditions.

THE MEYERS-MESCO CONSISTENCY REGULATOR

has stood the test of time and is regulating consistency in scores of mills well known to the trade. The number is increasing month by month.



THERE IS A REASON

for it and that reason is the fact that this regulator operates on a principle that is so simple and fundamental, that it could not fail to work.

There is no need for guesswork. Ask your neighbor or some one who is using Meyers-Mesco Control or write us for reference to mills whose requirements are similar to yours.

MERRITT ENGINEERING AND SALES CO., INC.

LOCKPORT, N. Y.

WATER FEEDERS **VISCOSITY REGULATION**

VENEER AND PLYWOOD MACHINERY

head-tower of the machine. When the machine is moved, the ramp is picked up by the hydraulic mechanism, and lowered when the move is completed. The scraper dumps its load into a trap or hopper over the car or conveyor.

Fig. 6 shows an installation of one of these machines for storing and reclaiming coal at an industrial plant on the Detroit River. In this installation, the coal is received by self-unloader boat and discharged off the boom conveyor of the boat into a long "cushion" pile parallel to the dock. A 6 cubic yard Sauerman Crescent scraper bucket spreads the coal over the storage area—450 ft. wide by 800 feet long—and subsequently reclaims all the coal, reloading the coal to cars which are hauled to the power plant.

This type of storage machine is of special interest to plants that receive coal and other bulk materials by boat, as these plants have problems of storing and rehandling large cargoes and rapid handling generally is essential. The installation in the photograph has an hourly handling capacity of 400 tons when the scraper bucket is operating at its average length of haul. Smaller and larger machines of this type have been designed to meet almost any capacity requirement.

b. Pulverized coal preparation and firing.

The Babcox & Wilcox Company.

The B&W Type B pulverizer with integral feeder and blower, developed by the Company for the small industrial plant is continuing to deliver complete satisfaction in a growing number of installations. A number of improvements have been made in this mill this year, making it simpler and even more desirable for installation with small direct-fired boilers. This equipment is shown in Fig. 7.

Foster Wheeler Corporation.

Developments in the solid fuel preparation and firing field have not been radical but have been notable chiefly in perfecting continuity of performance, long periods of operation without shut down, precision of control and wider range of applicable fuels.

In connection with unit type ball mills, particularly, the success of the fuel feed controller has made it possible to meet rapidly varying loads of great magnitude without difficulty. The application and operation of the fuel feed controller are described below.

To overcome the difficulty of manual control—since no operator had any definite means of determining the quantity of fuel within the rotating drum,— a level controlling device has been put into service that provides definite limits between which the coal in the mill is maintained. The device includes two pipes extending through the hollow trunnion into the rotating mill. One pipe extends into the upper portion of the mill and the other is bent downward so that its end is at the level desired for the coal within the mill. The pipes are carried outside of the mill and a small orifice opening is provided in each to permit a small amount of air to leak into the pipe due to the suction set up in the mill by the exhauster fan.

The ends of these pipes outside of the mill are connected to the top and the bottom of a cast iron chamber in which is a float resting on mercury. The float is shaped like a flat bell in order that the pipe connecting to the bottom of the chamber may create a suction below the float. The other pipe connects to the top of the chamber so that it may create a suction above the float.

If both pipes within the mill are subjected to the suction of the exhauster fan, there is equilibrium in the flow chamber and the float takes a position due to its weight. Should the pulverized coal in the mill rise in level until it seals the end of the lower pipe, suction will cease below the float and the float will rise due to the suction created in the top of the chamber. This movement throws a mercury switch which in turn operates a relay stopping the feed motor. When the exhauster fan has removed sufficient pulverized coal from the mill to uncover the end of the lower pipe once more, suction will again exist below the float and it will return to its original position of equilibrium and the feeder motor will start and additional coal will be supplied to the mill.

Burners have been improved considerably and they are now more flexible than in the past and the direction and control of burner nozzles has been so improved as to materially increase the effectiveness of furnaces.

Recently the first application of a unit system for burning anthracite coal has been ordered and the performance will be watched with unusual interest. Anthracite has been prepared in ball mills in connection with storage systems for many years, but this is the first attempt at using anthracite coal in unit systems and ball mill pulverizers are to be employed due to their low grinding cost with such hard material.

B. F. Sturtevant Company.

A few years ago the B. F. Sturtevant Company was given the right to build a cinder catching device by a company known as the Pease-Anthony Equipment Company. This company had developed a wet type of cinder eliminating device and they, in connection with the Edison Electric Illuminating Company of Boston, and the B. F.

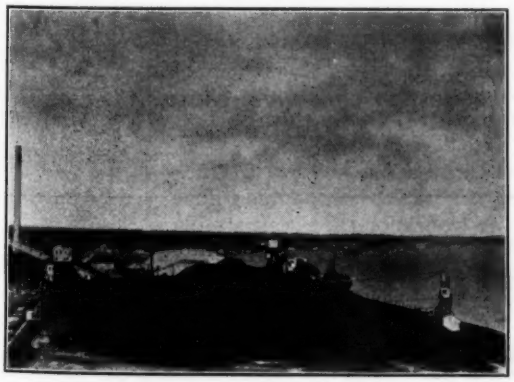


FIG. 6

Sauerman tower scraper storage machine installed to store and reclaim coal on a storage dock 450 ft. wide and 800 ft. long. (Sauerman Bros., Inc.).

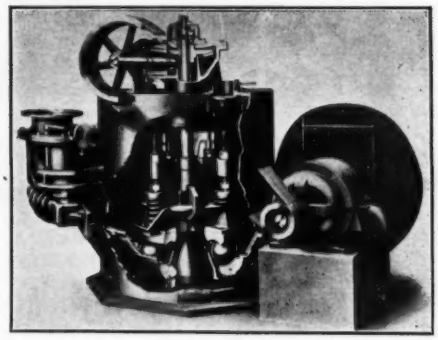


FIG. 7

B. & W. type B pulverizer with integral feeder and blower. (The Babcock & Wilcox Co.).

Those "Worn-out" Press Rolls!

Even with new jackets, bronze or iron press rolls will quickly develop etched and pitted surfaces which pull the fibres and open the texture of the paper.

CRODON plate on metal press rolls or carrying rolls supplies *and maintains* a smooth, hard, slippery surface, of noteworthy assistance in the prevention of sticking, uneven drying, inaccurate crowns and frequent roll adjustment.

This imparts to the paper a smooth, *consistently uniform* finish . . . . the delays and expense of grinding and eventual replacement of rolls are eliminated.

New:

Our plants have developed new and improved methods of recovering worn, porous or corroded rolls. Blemishes and imperfections are abolished . . . . the desired *perfect* surface, well bonded to the base metal, is obtained . . . . *enduring* new-roll performance at low cost is assured.

CRODON
The Chrome Plate
TRADE MARK REG. U. S. PAT. OFF.

Fix those rolls *now*, and fix them *RIGHT*

Our service is available immediately. Rolls are out of service for only a short time before they are again ready for use, restored to new-roll condition and insured by CRODON for long and satisfactory service.

The trade-mark CRODON assures the best in chromium plate

Your own investigation of CRODON should be decidedly worth while, judging from the experience of many representative companies whose substantial cost-reductions and trouble-free operations are consistently attained with the aid of CRODON plate.

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Chromium Corporation of America

Executive Offices—120 Broadway, New York

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3125 Perkins Ave.
Cleveland, Ohio

4645 West Chicago Ave.
Chicago, Ill.

Sturtevant Company carried on a series of investigations just before the district steam generating plant of the Edison Electric Illuminating Company was to be built in the heart of Boston. Test results were successful and a full sized installation was put into operation with the first two boilers that went into the plant. Many difficulties were overcome on this initial installation and the design was finally worked out into its commercial form and a second installation was installed. This is a powdered coal plant located in a congested section of Boston yet no complaint of cinder emission has been filed or heard of. Careful tests have been made and it is found that this type will collect about 98 per cent of the troublesome cinders.

Some such device would undoubtedly be of value in the paper industry to prevent the cinders from getting back into the plant resulting in a spoilation of the products.

c. Coal Burning.

The Babcock & Wilcox Company.

Industrial power plants are continuing to show interest in combination firing or pulverized fuel with oil and gas. The company has developed burners, making it possible to burn pulverized coal or coke, oil or gas singly or in combination. This enables the user to take advantage of fluctuations in the fuel market at any time. These combination burners are available for both water-cooled and refractory furnaces.

Existing installations can be readily convetred to combination firing.

The Company has developed automatic lighters for pulverized-coal burners which have proved highly satisfactory. These lighters can be applied to circular, intertube, multiple intertube and cross-tube burners. They are particularly applicable, from the standpoint of safety, for units of all size which burn fuel with a volatile content of less than 23 per cent and although high volatile coals can be ignited with reasonable safety to the operator with the usual non-automatic lighters, the desirable features of automatic lighting are a justification for its installation in a large number of cases. Automatic lighters can be supplied in either oil-burning or gas-burning types, depending upon the existing conditions. The advantages of this method of lighting can be summarized as follows:

Cleanliness—No burning oil-soaked cotton waste is required for lighting the oil or gas.

Greater safety—A continuous spark keeps the oil or gas flame established; also due to remote control, it is not necessary for the operator to approach the burner, thus avoiding any danger due to a back-flare. The lighting equipment is so arranged that all lighters operate at the same time and there is no possibility of an operator starting coal through a burner on which the lighter is not functioning.

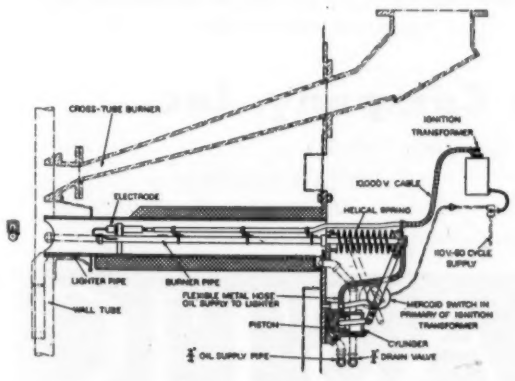

FIG. 8

Babcock & Wilcox automatic oil lighter for cross-tube burner. (The Babcock & Wilcox Co.).

Simplicity and speed of operation—Any number of burners can be lighted almost simultaneously and with a minimum of effort. For the frequent starting often required to bring a boiler on the line, or for intermittent firing under low-load operation, this feature becomes a real asset in enabling the operator to perform his job safely and correctly. When the oil-burning lighter is used, a period of approximately 4 seconds is required from the time the pump is started until the oil is lighted at the burner tip. Drainage takes the same time from the moment the stop button is pressed until the burner is in the retracted position. With gas the time is even less.

Increase life of the burner tip—Due to the automatic withdrawal of the oil burner tip from the furnace when not in use, the possibility of burning the idle lighter is minimized.

Economy—An uninterrupted flame for ignition results in a minimum time in service for the lighter, and economical use of both lighting fuel and coal. Fig. 8 shows an automatic oil-burning lighter as applied to a cross-tube burner.

Ferguson Engineers.

In the burning of pulverized coal the "Gyro Gasifier Pulverized Fuel Burning System" offers something new in the burning of pulverized coal. In this system the pulverized coal carried by a small part of the air is admitted with our burner tangentially and at high velocity into an inverted pear shaped furnace. Secondary air is admitted through other inlets. By the proper regulation of the secondary air inlets the height of the flame above the cowl of the furnace, which corresponds to that of a gas jet flame, is adjusted to suit the space between the furnace and boiler unit. Due to the action of the fuel and air within the furnace, the fuel remains suspended until completely gasified. A film of slag adheres to the furnace wall which protects a wall from the abrasive action of the coal particles. Only mild temperatures are encountered near the gasifier walls, the extreme temperatures are being reached above the furnace cowl where the combustion is completed.

The particular advantages claimed by this system are: much greater (several times) fuel burning capacity in a given space, higher furnace and boiler efficiency, lower first cost, and large recovery of the fuel ash (in dry form) in the ash pit below, which reduces the fly ash trouble to the stoker class.

B. F. Sturtevant Company.

During 1934 the West Virginia Pulp and Paper Company have installed new Riley boilers in their Covington, and Luke plants. The Covington boilers were originally designed for 350,000 pounds of steam these boilers actually evaporated more than 450,000 pounds of steam. Assisting in this remarkable result were the Sturtevant Vane Controlled Fans. Two induced draft fans for each boiler, each handle 102,000 c.f.m. at 16.3 inches pressure taking 400 h.p. For the forced draft two Sturtevant Turbovane Fans with vane control were furnished for each boiler, each fan handling 72,000 c.f.m. 14.5 inches pressure, 250 h.p.

These fans are the most modern and up to date fans that can be purchased and it is interesting to note that the size of this equipment is larger than used in most public utilities. This shows that modern industrial power stations

With 9 50-lb. weights on each compound lever, Tensilastic beat all others 34 days

With that tremendous pressure (9 50-lb. weights) hanging on the end of each compound lever, a Tensilastic rubber covered press roll in the second press position of a 204" newsprint machine, ran at high speed, 34 days longer, before grinding, than the next best roll.

This roll ran 84 days before grinding. The longest previous run in that position was 50 days. Some rolls in the same position ran only 18 days before grinding was necessary.

With the production of this machine at approximately 100 tons of newsprint a day, this Tensilastic produced about 3400 tons more paper before grinding was necessary, than the best previous roll. Think of the reduction in cost per ton of paper. A reduction that over a period of time runs into real money. With that saving, this Tensilastic will soon pay for itself.

The excessive weight on that roll of course, was unusual. But special conditions required the use of more weight and the Tensilastic stood up under it. Stood up—and out-ran all other previous rolls. 34 days longer than the next best roll and under heavier pressure than the other rolls *ever* carried.

But that run is not unusual—not for a Tensilastic rubber roll. We have plenty of records showing almost unbelievable performance. Certainly, there's a reason. Tensilastic isn't just a hit or miss proposition. It's the result of over 40 years of rubber roll manufacture, coupled with careful research, laboratory planning and laboratory control, through every stage of processing.

Write for copies of
"The USE and ABUSE of RUBBER ROLLS"
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There is only one way you can prove Tensilastics—press, table, breast, couch, wire or carrier rolls—will out-perform other rolls. Do as that newsprint mill did. Put one in your machine. Give it the toughest position you have and watch it. Check its performance against that of previous rolls in the same position. You too will be convinced of the superiority of Tensilastic rubber rolls.

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Rubber Roll Specialists For More Than 40 Years

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REG. U. S. PATENT OFFICE

are paying as much attention to the economical generation of power as any public utility.

The vane control fans are the latest invention of the B. F. Sturtevant Company and consist of a series of vanes installed in the inlets of the fan so arranged as to control the spin of the air or gas when entering the fan. In so doing the volume and pressure are increased or decreased at will and through an infinite number of points of control. These fans are commonly used in the Public Utilities and are now being rapidly introduced into the Industries. There is a saving in power from 15 to 30 per cent over that of the slip ring motor and the cost of the vane control is usually less than the slip ring motor control.

d. Ash Handling.

The Fairfield Engineering Company.

The Fairfield Engineering Company of Marion, Ohio, has recently developed a new type of water collecting ash gate.

The ash gates are built in two sizes, 24 x 24 inches and 24 x 36 inches, providing ample openings for the discharge of any clinkers, and are constructed of grey iron castings.

The gates are arranged for hand operation, being pivoted and counterbalanced, a slight pressure on pull-rod being sufficient to open or close. Roller bearings are fitted in the gate bearings, adding to the ease of operation.

The gate plates are fitted with a tile lining to resist the action of water and heat. The tiles are laid in high temperature cement and each tile is further securely held in place by hook bolts and through rods.

The water collection system consists of a fixed drain trough to which a pipe is connected for carrying off the quenching water to the drainage system.

B. Gas and Oil Fired Plant.

a. Fuel Storage and Handling.

Nothing was submitted.

b. Gas and Oil burning.

Coen Company.

Coen Company's development for 1934 in connection with the pulp and paper industry consists of an improved air register adapted for burning gas and oil fuels, either separately or together, primarily for steam generation.

Referring to Fig. 9, when this improved air register is used with a boiler setting designed for natural draft plate "B" is dispensed with. When the setting calls for forced draft, air cooled walls or floor, etc., plate "B" is used and forms the wind box. In either case the draft may be controlled by Shutters 936-G and Operating Handle 935-D.

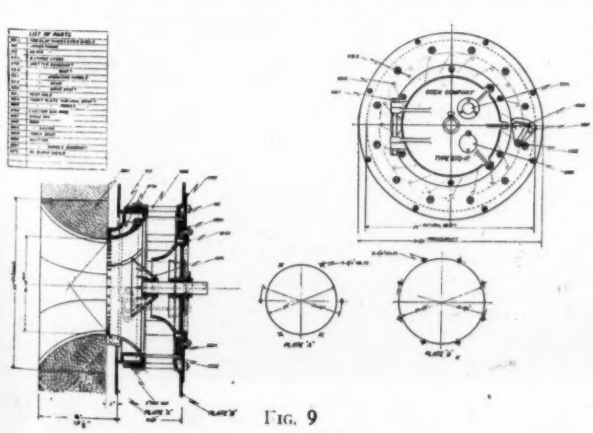

Fig. 9

Combination gas and oil burner. (Coen Co.).

The oil burner may be of either mechanical or steam atomizing type. The drawing shows the register fitted for gas burning. When oil only is the fuel, three plain throat segments are used in place of the gas segments. Gas and oil segments as well as oil burner shield are heat resisting alloy castings.

A recent purchaser of the register described above is the Lawrence Paper Company, who placed an original and repeat order for these registers fitted for both gas and oil burning.

Other users of Coen burners in this industry are the National Paper Products Company, Ranier Pulp and Paper Company and Washington Pulp and Paper Company.

C. Wood and Other Refuse Fuels.

a. Fuel Storage and Handling.

Nothing was submitted.

b. Fuel Burning.

The M. A. Hofft Company.

An installation of particular interest was made this past year at the plant of the Chesapeake Corporation at West Point, Virginia. A high pressure boiler and M. A. Hofft Company furnace equipment was installed for burning bark. The proper design of furnaces and fuel feeders for burning bark is a matter which should be given very careful attention by pulp mills.

D. Combustion and Boiler Control.

Bailey Meter Company.

A Bailey control system of the air-operated type has been developed to meet the need for a simple, accurate and reliable means of automatically controlling combustion in the industrial power plant.

This new Bailey control system can be profitably applied to one or more boilers of 200 h.p. or larger and fired by oil, gas, pulverized coal or stoker. It automatically accomplishes the three functions essential to most efficient and satisfactory boiler performance. First, the fuel and air are supplied in proportion to the steam demand; second, the relation between air and fuel is regulated to give highest combustion efficiency consistent with economical operation; third, the furnace draft is maintained at the desired value.

A master controller of either the indicating or recording type, is furnished for the master panel for the entire plant. This controller contains a pilot valve which is supplied with clean filtered air at 35 pounds per square inch pressure, and whose position determines the air pressures which exists in the control lines leading to the individual boiler panels and thence to the control drives or power units. When a change in steam demand occurs, there is a corresponding change in steam pressure, which actuates the Master Pressure Controller to reposition the pilot valve, thereby changing the air loading pressure sent to the control drives which will regulate the quantity or speed changing devices to correct the rates of fuel and air supply for the new conditions.

Each boiler is provided with a Bailey boiler meter mounted on the individual boiler panel, which contains another air pilot valve actuated by the relation between the steam flow and air flow mechanisms. This pilot valve will provide necessary readjustment in the position of the control drive on either fuel or air so that the correct relation between air and fuel is continually maintained for high combustion efficiency.

The control drives which are of the air piston type may be furnished in three sizes and are definitely positioned for each loading pressure applied to them. They are simple in design and dependable in operation. They are used to

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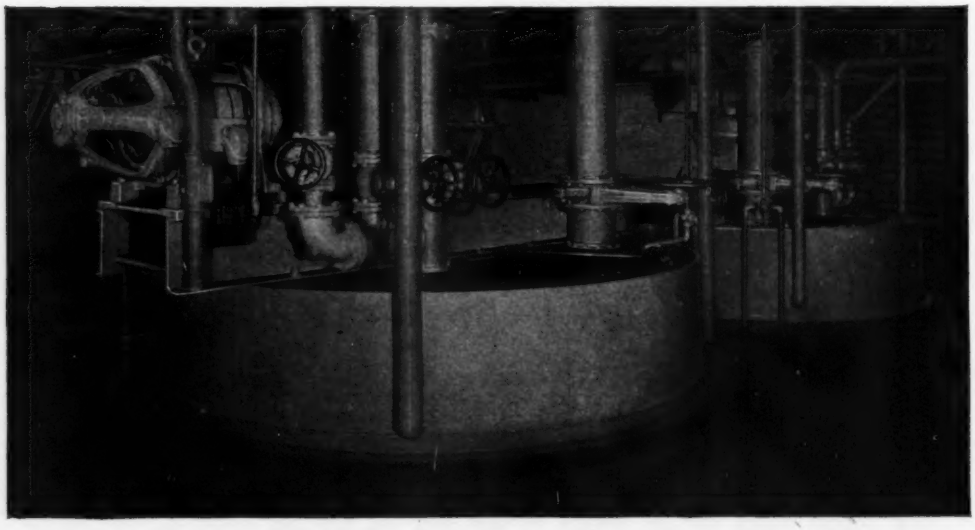
THE APPLETON VORTEX BEATER

• • a radical departure from the design and operating principle of most beaters now in use. It requires only half the floor space necessary for a standard beater of equal capacity. It produces fast circulation, thorough mixing, has a short distance of stock travel. It shortens the beating cycle with quick loading, no plugging, fast circulation, motor driven adjustment, improved beating action, rapid dumping and is practically self-cleaning. All of the rotating knives are in stock and in contact with all of the bed plate knives during the entire time of beating. It has low power consumption, a 75 H.P. motor. Motor and speed reducer are mounted on channels resting on the beater cover, making expensive transmission devices unnecessary. The Vortex principle of stock circulation provides greater beater efficiency, eliminates the horizontal flow of stock. Operating economies are very pronounced. Vortex Beaters have been in mill operation for a number of years. Their practicability, versatility and operating advantages have been clearly demonstrated. If you are interested in faster, better beating with less power, let us give you the complete facts about the Appleton Vortex Beater.



THE APPLETON MACHINE COMPANY
APPLETON, WISCONSIN

operate damprs, stoker speed changing devices, drum controllers or rheostats on electric motors, brush shifting devices and other similar equipment.

Furnace draft is maintained at the desired value by controlling either the forced draft supply or the induced draft supply depending on the type and layout of the equipment installed. The furnace draft is accurately measured by either a large sensitive diaphragm or by a suitable oil sealed bell, which in turn operates an air pilot valve which causes the control drive to be properly positioned.

By the use of selector valves on the various panels, it is possible to place the entire plant on manual control if desired, or to place any given factor such as stoker speed or uptake damper of one boiler on manual control when conditions make it desirable.

The principle on which the Bailey control system operates combined with the type of construction used for its component parts makes the system readily adaptable to all kinds of conditions or plant layouts.

Leads & Northrup Company.

A new metered combustion control equipment, which meets the need for a control that operates boilers at highest efficiency, despite violent fluctuations in dmand, and yet is simple, compact, economical in purchase price and easy to install has been developed.

Mounted on one panel are the master controller and the individual controllers for fuel feed, air flow and furnace pressure. These instruments are completely connected to each other, and to switches and push-button stations. Through these, boilers can be operated on full automatic control, individual automatic control or manual control at an instant's notice.

The control is air-electric in type—pressure in an air line to the controller is varied in response to changes in header pressure, and the controllers respond in turn by closing contacts that operate heavy-duty electric drive units and so change the fuel and air supplies to meet the new load condition. Equal or bias load distribution between boilers may be obtained. Some boilers can be operated on base load while others take the swings. Fuel-air ratio can be changed in an instant. In every detail, this Control meets the need for high efficiency control at low cost.

Republic Flow Meters Company.

A new Smoot regulator known as "Series 50" has been designed primarily for the control of industrial boilers. It embodies all the qualities of sensitivity, power, speed and stability which have earned such an enviable reputation for Smoot regulators among central station operators. This new "series 50" Smoot regulator brings central station efficiency to the small industrial power plant. It will control furnace draft—boiler air—oil flow—stoker speed or fuel feeder speed.

This new regulator uses either water or oil pressure as a source of operating power. It is equipped with a built-in relay cylinder which will produce ample power to operate dampers or other control devices on industrial boilers. The power requirement does not affect the sensitivity, speed or stability of this regulator.

Re-designed to permit unit assembly, the Smoot master control is now available in any number or combination of control units desired. This new type of assembly permits the selection of those units necessary for the mechanical control of any particular installation whether it be the control of a single 250 h.p. boiler or a battery of central station units.

E. Steam Boilers, Generators and Superheaters.

a. Boilers, Generators and Superheaters.

The Babcock & Wilcox Company.

The chief development of the Company during the past year for industrial plants has been the B&W integral-furnace boiler. This new unit is designed to provide a completely coordinated unit comprising a two-drum boiler, a water-cooled furnace, burners for liquid, gaseous, or pulverized solid fuels, and when needed a superheater, economizer, and an air heater. This unit is particularly applicable in industrial plants where operation at high nominal ratings with high final steam temperatures, and where high efficiency is desired. The arrangement of the boiler proper, with inclined tubes entering an upper and a lower drum, and with the furnace paralleling the drums and separated from the rows of tubes by a furnace wall, instead of the conventional arrangement of boiler set over furnace, makes its installation advantageous where headroom is limited. The large furnace volume required for pulverized-coal firing of other types of boilers of the same capacities as the integral-furnace boiler, but with refractory-lined furnaces, has penalized this method of firing more than it has any other in first cost, operation and maintenance. This new unit removes this handicap, since water-cooled furnace walls are applied to this boiler at a fraction of the cost for applying this construction to conventional boilers of the same capacities.

The general arrangement of this unit is new and somewhat unfamiliar, but each different element is of a design that has been used successfully in the past, thus enabling the Company to so apply its experience to this unit that its performance can be predicted with a high degree of certainty. The method of combining these elements in a modern design to suit the needs of industrial plants is alone new.

Several of these units have been in very successful operation for a number of months, and their performance has exceeded the anticipated in every case. As an example, a southern cotton mill now produces power as well as process steam at an overall fuel rate of but 1.2 pounds of coal, or 17,200 B.t.u. per kilowatt hour. Fig. 10 shows this boiler.

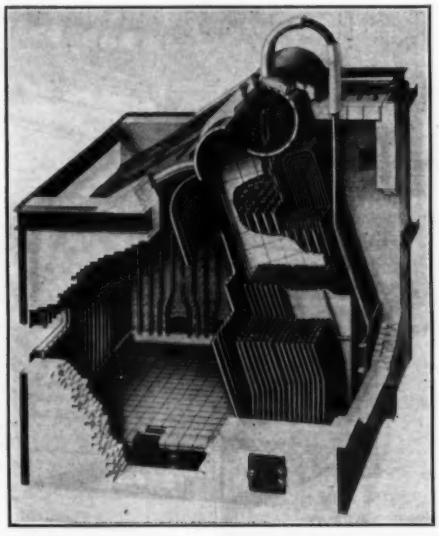


Fig. 10

Babcock & Wilcox integral furnace boiler. (The Babcock & Wilcox Co.).

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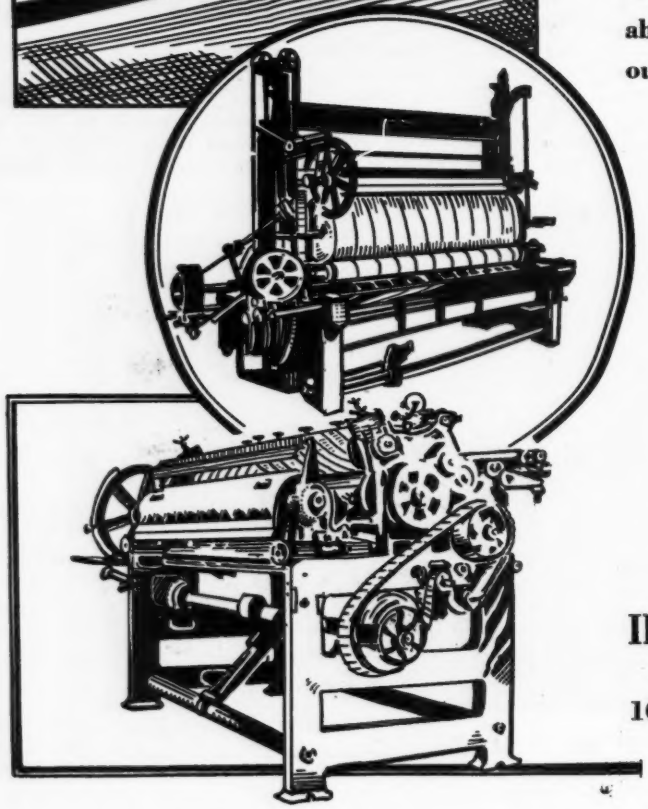
A MESSAGE TO PAPER MILLS



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Combustion Engineering Company, Inc.

Generally speaking, 1934 was not a year of spectacular accomplishment in the power plant field, but rather it witnessed the crystallizing of certain previous innovations into accepted practice, refinements in the design of equipment, advances in metallurgy and marked evidence of management displaying greater interest in its power problems. The major activity was in the industrial power field, particularly the process industries, and there appears to be a marked trend to take advantage of what is now standard practice in the higher pressure field, namely, 400 to 800 pounds, to install high-pressure boilers and turbines exhausting into the existing low-pressure systems. Thus advantage is taken of the greater economy at minimum expenditure. Greater attention is also being given to fuel saving though improved firing methods and stoker sales have been large.

Boiler types still appear to be largely a matter of personal preference on the part of the purchasers, but completely water-cooled furnaces and air pre-heaters are finding general acceptance. Moreover, fusion welded boiler drums are now being employed for practically all pressures. Among the larger installations the trend is toward higher steam temperatures and recent developments in superhearter practice insure a relatively constant steam temperature over wide ranges in load. The reliability of large steam generators has reached a point where their availability factor is as high as that of the turbines they supply, hence the increasing use of the unit plan, that is, one boiler per turbine.

Passing to specific developments by Combustion Engineering Company, the well known Green chain grate stoker has been redesigned to enable the frame better to cope with expansion and to provide fixed attachments for the controls. A new design for the Coxe traveling grate stoker has been brought out to adapt it to wider furnaces, up to 24 feet and improvements have been made in the structural members.

In association with the D. J. Murray Mfg. Co., Combustion Engineering Company has introduced the improved Murray-Waern system of chemical recovery for soda and sulphate pulp mills. This is a complete chemical and waste-heat recovery unit employing a water-cooled smelter, rotary drier, waste-heat boiler, air preheater and disk evaporator. Calculations indicate that about 50 per cent of the waste heat is recovered in the form of steam at any desired pressure and that approximately 10,000 pounds of steam is available per ton of pulp made. One of these installations is now nearing completion at the plant of the Hummel Ross Company, Hopewell, Va.

To give a cross-section of what is being done in the industrial power plant field it may be pertinent to mention some of the boiler installations made by Combustion Engineering Company during 1934 or contracted for. These include, among others, a 900,000 pounds per hour bent tube boiler for the Ford Motor Company which will operate at 1400 pounds steam pressure and 900 deg. F. steam temperature; a 350,000 pounds per hour sectional-header boiler for the Firestone Tire and Rubber Company at Akron which was recently completed to operate at 1400 pounds pressure and 769 deg. F. steam temperature, with a slagging furnace, completely water-cooled walls and air preheater; two 85,000 pounds per hour stoker fired boilers for the Colgate-Palmolive-Peet Company at Jersey City, N. J., to operate at 440 pounds pressure and 600 deg. F. steam temperature; two 125,000 pounds per hour 650 pounds pressure boilers for the U. S. Industrial Alcohol Company; a 120,000 pounds per hour boiler for the Pennsylvania Salt Company at Wyandotte, Mich.; three 45,000 pounds per hour bent tube boilers for the Chevrolet Motor Car Company; a 70,000 pounds per hour 448 pounds pressure stoker fired boiler for the Container Corporation of America; a 120,000 pounds per hour pulverized coal fired boiler operating at 450 pounds pressure for the Ampthill, Va., plant of the DuPont Rayon Company and two 594 pounds pressure sectional header boilers rated at 125,000 pounds per hour (170,000 pounds max.) for the old Hickory plant of the same company.

Foster Wheeler Corporation.

The usually accepted boiler for high grade industrial work is a bent tube or cross drum unit carrying 400 or 450 pounds pressure and equipped with water walls, superheaters and heat recovery devices; either economizer, air heater or both. Such units are designed for high capacity and to cover wide fluctuations of load almost instantaneously. They do not differ materially from the units of other industrial plants and with up-to-date firing equipment high efficiencies are obtainable at very little more cost than a relatively inefficient installation.

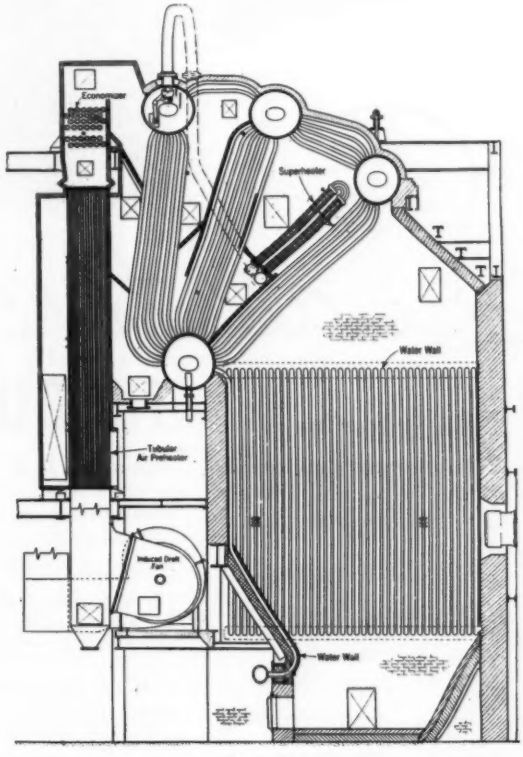
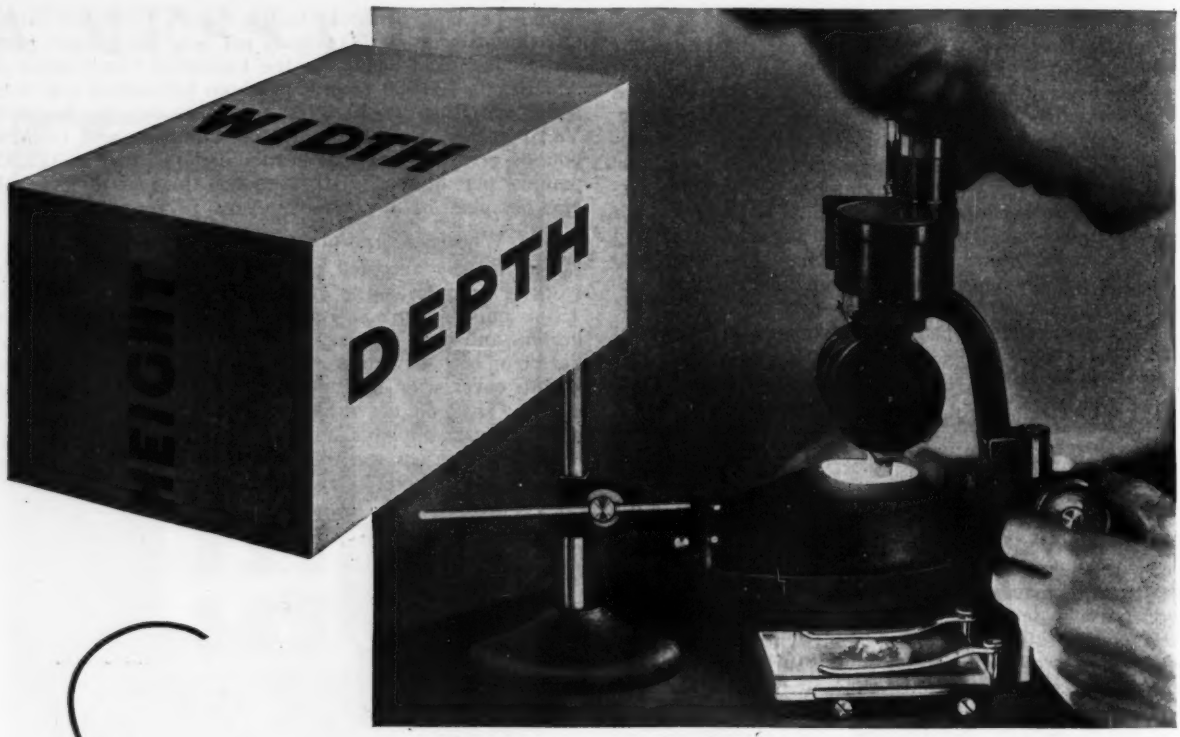


FIG. 11
Foster Wheeler steam generator Blandin Paper Co. (Foster Wheeler Corp.).

Fig. 11 shows such a steam generator as described. The boiler is rated 686 h.p., steam pressure 450 pounds, final steam temperature 460 deg. F, economizer 1404 square feet and air heater 9,580 square feet.

Riley Stoker Corporation.

During 1934 we installed Riley steam generating units at the Luke, Md. and Covington, Va. plants of the West Virginia Pulp and Paper Co. We believe these two installations were the outstanding installations of steam generating equipment made in the pulp and paper industry during the year and believe they also rank as the outstanding installations in this industry up to the present time.



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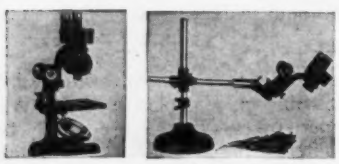
5. Its range of magnifications* fills the gap between and overlaps those of the magnifier and conventional microscope.
6. Made in many models for your specific requirements.

One look through this remarkable instrument will reveal to you a number of uses in your own plant. Write for complete details to Bausch & Lomb Optical Co., 627 St. Paul Street, Rochester, N. Y.

***Recently the range of magnifications of the KW series has been increased from 7—87X to 7—150X, a development which further increases the scope of usefulness.**

Below: Two different stands on which the KW Microscope can be mounted for specialized work.



Bausch & Lomb

We make our own glass to insure standardized production. For your glasses, insist on B & L Orthogon Lenses and B & L Frames.

OPTICAL INSTRUMENTS FOR THE INDUSTRIES

We also installed equipment at the Kalamazoo Vegetable Parchment Company. This is also an excellent modern installation of steam generating equipment.

The installations at the West Virginia Pulp and Paper Company are designed for a maximum capacity of 375,000 pounds of steam per hour. The Covington plant has a working pressure of 600 pounds and 750 degrees total steam temperature. The Luke, Md. plant operates at 645 pounds pressure and 700 degrees total steam temperature. These units are designed for an operating efficiency of 86.1 per cent at 200,000 pounds of steam per hour.

The Kalamazoo Vegetable Parchment installation was designed for a maximum steam output of 160,000 pounds of steam, operating pressure 276 pounds and total steam temperature 650 degrees. This installation is designed for an operating efficiency of 86 per cent at 100,000 pounds of steam per hour.

The installations are all fired by pulverized coal and each of them is equipped with a flue gas scrubber for elimination of fly ash from the stack.

Henry Vogt Machine Company.

The developments for 1934 consisted in improvements and rearrangement of our six types of boilers to perfect circulation with resulting higher capacities and efficiencies due to active circulation.

Yarnall-Waring Company.

The Yarnall-Waring Company announces several improvements in the well-known Yarway floatless Hi-Lo alarm water column and sesure-inclined water gage for boilers. The following standard Yarway features have been retained. The use of balanced solid weights, working on displacement principle to operate the whistle alarm at high and low water levels; attachment of gage valves directly to water column, with chains set well back from gage glass, to allow clear vision of inclined water level in glass and to prevent strain on the glass by chain pull; gage glass inclined from vertical to permit reading water levels from below.

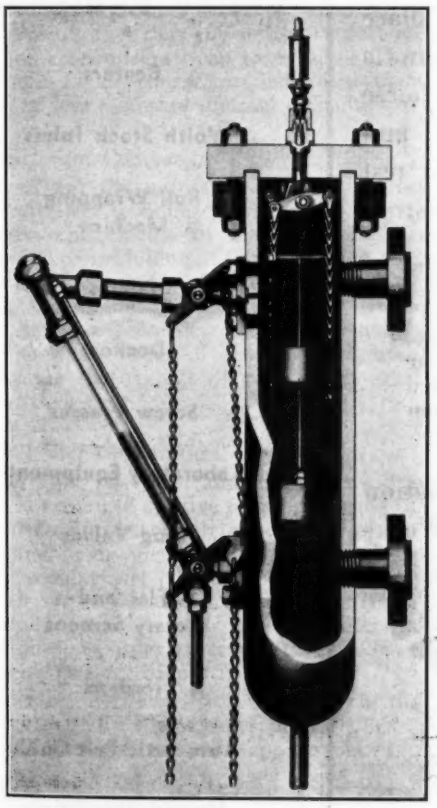


FIG. 12

Yarway floatless Hi-Lo alarm water column. (Yarnall Waring Co.).

The improvements include a smaller, lighter water column body, a simpler more flexible and more responsive operating mechanism for the Hi-Lo Alarm; inclined connecting member at top of gage, which drains back the condensate that might otherwise collect at this point and cause erosion and corrosion of the glass.

Yarway water columns and gages are built for working pressures up to 1500 pounds. For pressures up to 250 pounds, the water column is made of cast iron, for higher pressures, the column is wrought steel. Tubular gage glasses are used for pressures up to 400 pounds; for higher pressures, flat glass inserts are furnished. A special feature of the Yarway heavy duty flat glass insert is an offset condensate groove which carries condensate down alongside the glass, thereby eliminating the corrosive and erosive action of this moisture.

The new floatless Hi-Lo alarm water column is shown in Fig. 12.

The Permutit Company.

Engineers have long recognized the economy of recovering the heat from boiler blowoff water. They have also appreciated that the cooling of such waters permitted automatic flow control introducing further economy in the operation. The new plate type heat exchanger illustrated in Fig. 13 is Permutit's latest contribution to this field. It employs a radically different principle of construction from the tubular types.

FIG. 13

Heat exchanger. (The Permutit Co.).

It consists of a series of sections, firmly bolted together with tie-rods, to form a bundle which is enclosed in a heavy casing. There are no thin metal walls and the solid castings can withstand high pressures without danger of leakage or failure.

The blowoff water passes between the plates in the bundle, while the cooling water circulates countercurrent to this flow, on the outside of the plates. Thus the two separate streams of blowoff and cooling water are continuously changing their direction as well as their forms, from thick streams to thin layers. This creates turbulence and prevents the formation of stagnant liquid films on the heat transfer surfaces. It is well known that such a film impedes the efficiency of heat transfers.

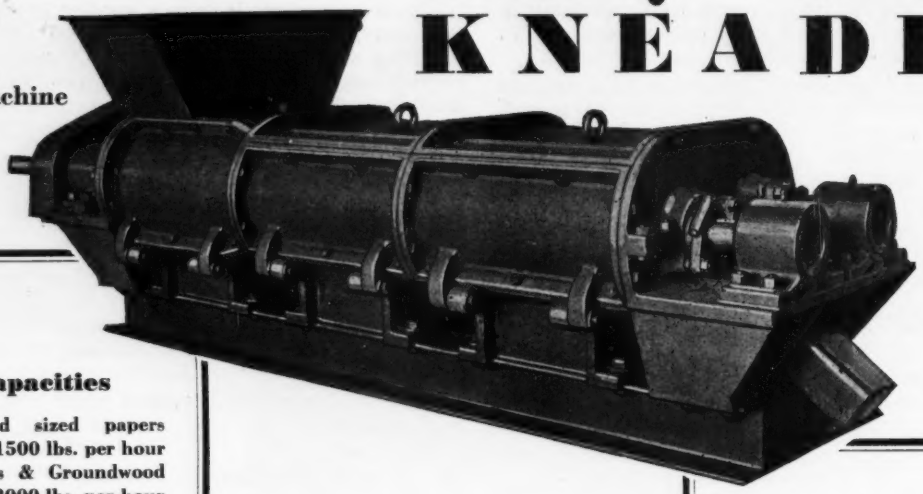
This new design makes it possible to transfer much more heat per unit area of heating surface (for a given period of time and a given temperature) than in the tubular heat exchanger. Thus it is possible, for a given capacity, to make these heat exchangers much smaller and more compact. In addition, the heat transfer surface may be increased by merely adding plates to the bundle and bolting on a new shell section.

The prevention of foaming, priming and carry over of soluble salts, in boiler operation, depends largely on maintaining the concentration of the boiler salines below a

TAPPI SECTION, PAGE 86

INVESTIGATE THE NEW Valley - Voith KNEADER

No. 4 Machine



Capacities

On hard sized papers
1200 to 1500 lbs. per hour
On News & Groundwood
1500 to 2000 lbs. per hour

Comparison of Mullen Tests

Voith Kneader No. 4
2 to 3% variation
Broke Beaters
7 to 8% variation

Comparison of Power Tests

1 Voith Kneader No. 4
60 Horsepower
2 Broke Beaters
100 Horsepower

One Voith Kneader is equal in capacity to two Broke Beaters of the size usually used.

We also build a No. 3 machine in which the last section is omitted. This machine operates at about 40 H.P. with capacity of 25 to 30 tons of broke or sheet pulp. Will give only 90% disintegration. The No. 4 machine gives 100% disintegration.

THE Valley-Voith Kneader is a machine for handling broke, sheet or lap pulp in place of the Broke Beater. It shows a considerable saving in horse power, labor and space and maintains a higher Mullen test uniformity. One mill writes:

> "The promise on this machine was 1000 lbs. per hour of hard size broke with a 50 H.P. capacity motor. In our tests, as high as 1500 lbs. per hour of this broke were handled with 53.6 H.P. and one man feeding."

For complete information write to the Valley Iron Works Co., Appleton, Wis.

Other Valley Equipment

Beaters

Voith Stock Inlets

Roll Wrapping Machine

Pumps

Deckers

Screw Presses

Laboratory Equipment

Plug Valves

Flat and Rotary Screens

Jordans

Automatic Felt Guide

Hypoid Gear Drives

VALLEY IRON WORKS COMPANY

Plant: Appleton, Wisconsin

New York Office: 350 Madison Ave.

Canadian Representatives: Pulp & Paper Mill Accessories, Ltd., Montreal, Canada.

certain limit. This maximum concentration is not the same for all boilers but varies according to the boiler design and rate of evaporation.

One measure of this concentration is the total dissolved solid content (TDS) which is obtained by slowly evaporating a large sample and carefully weighing the dried residue. Another equally satisfactory index is the density of the solution which is related to the concentration of the dissolved salts. This density can be quickly and easily determined with a sensitive and properly designed hydrometer.

For years The Permutit Company have offered such sensitive hydrometers with integral temperature correction scales as an aid to boiler operators. However, this sensitivity required a rather frail glass stem construction. They have now developed a hydrometer with an unbreakable metal stem that is at the same time about 300 per cent more sensitive than the all-glass type.

This new precision instrument is provided with an integral thermometric correction scale that permits obtaining the corrected reading by immediate observation. It is calibrated in terms of grains per gallon of dissolved salts as sodium chloride (NaCl) which is a handy arbitrary scale for such a sensitive instrument. It can be furnished with a zero calibration at either 80 deg. F. or 160 deg. F. for use in plants with or without heat reclaiming equipment.

F. Economizers.

Foster Wheeler Corporation.

Paper mills were among the early users of economizers of the high pressure type and the application has continued to increase from year to year. No revolutionary developments have occurred and it is only when burning exceptionally difficult fuel that any unusual effort is necessary to keep the economizers clean externally. The matter of boiler water is, of course, an individual plant problem and in very few cases are internal difficulties of any seriousness.

B. F. Sturtevant Company.

The last year has witnessed a marked increase in the sale of cast iron economizers. For the most part these have been replacements of machines that have served their periods of usefulness. The industries, as well as the public utilities, have given this matter their attention and it indicates to us that those plants whose economizers are wearing out have considered them of enough value to warrant an expenditure of money to replace them and thus continue the savings of coal which are now more important than ever.

G. Air Heaters.

Foster Wheeler Corporation.

Tubular type, plate type and regenerative type air heaters have not changed relative positions during the last year and the use of preheated air is governed by the character of fuel and firing method. It is, of course, possible to fire unreasonably wet coal if an adequate supply of preheated air is available. In some paper mills it would appear well worthwhile to arrange for better protection of the coal piles, in order to reduce the effects of rain and snow during periods of precipitation.

Considerable headway has been made in the study of prolonging life of air heaters, especially when operated at relatively light loads and with appreciable sulphur in the fuel.

B. F. Sturtevant Company.

Air heaters are a newer piece of equipment than economizers so we have not witnessed the same experience of replacing this equipment as in the case of the economizer field. We believe, however, that those plants not now equipped with economizers could well afford to study the savings that would be possible by either the installation of an economizer or an air preheater for the purpose of reducing their fuel bill.

H. Boiler Feed.

a. Water treatment.

Elgin Softener Corporation.

This corporation which has done a great deal of work in the paper field in connection with boiler water purification, has developed a new instrument known as the "Hardimeter." The instrument will collect a sample of water and test the water automatically by means of the electric eye. The instrument makes it possible to continuously check the hardness of water being delivered by a Zeolite water softener. It can also be used for hydrogen ion tests and for color tests as well as for chemical tests.

The Permutit Company.

Super-Zeo-Dur, a new Permutit product announced in December, 1934, is a very significant development in base exchange or zeolite water softening.

Representing the culmination of half a decade of investigation on the part of two leading research workers in the field, it combines high exchange capacity with rugged hard grain structure. It bridges the gap between the relatively frail synthetic zeolites of high capacity and the rugged natural minerals. Furthermore, like Zeo-Dur, it produces a water of extremely low residual hardness even when considerable sodium salts are present. Thus it affords a material having a broad field of application and in addition offers specific economies in both equipment and operating expense.

Super-Zeo-Dur has twice the exchange capacity of regular Zeo-Dur or other properly processed natural glauconites. It is thereby possible to reduce materially the size of softener required to give a specified soft water delivery. Under other operating conditions, where maximum exchange capacity is not necessary, it is possible to reduce the salt consumption, which is generally the principal part of the operating expense, by as much as 35 per cent.

Previously, the operation of an industrial size zeolite softener required the manipulation of a multiplicity of individual valves with the attendant possibility of errors. In place of these, The Permutit Company is now offering a multiport single valve which controls all the operations of a complete softening and regenerating cycle. The operation being performed at any time is clearly shown on the indicating face-plate.

This multiport rotary control valve embodies a new principle in valve design, using a hard rubber faced distributing disc rotated from one position to another in contact with a stationary bronze port plate. The inlet water pressure acting on the top of the disc, aided by a spring, holds the valve disc firmly against the port plate. This pressure and a certain amount of flexibility inherent in hard rubber insures a valve that remains tight at all times. With this construction, wearing of the seat does not impair the operation or increase the tendency to leakage as is true with the plug cock multiport type. Permutit single valves may be easily installed upon existing equipment.

Following the development of an automatic zeolite water softener for household use, The Permutit Company developed a self-regenerating softener for industrial and municipal application. This completely eliminates the

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CHLORINE

Chemicals for the Paper Industry

CHLORINE
CAUSTIC SODA
SODIUM ALUMINATE
PENCHLOR
(Super-Test Calcium Hypochlorite)
PENCHLOR ACID-PROOF CEMENT
ALUM
ANHYDROUS AMMONIA
BLEACHING POWDER
(Standard Strength)

THE dependable quality of this product is the result of more than eighty-four years' experience in making chemicals for industry.

Furthermore, due to the convenient locations of our plants, quick deliveries of Chlorine can be made to all parts of the country.

Our specialized technical service is available without cost to adapt our products to customers' requirements.

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Branch Sales Offices: New York—Chicago—St. Louis—Pittsburgh—Tacoma—Wyandotte

"human element," thus in many cases greatly reducing the cost of operation.

The "heart" of this system is the multiport single valve described above. This valve is rotated by an electric motor from one position to the next. At each successive position the motor is stopped by the opening of a circuit breaker and remains stationary until the operation is completed. Thus, the operating cycle is performed as follows:

After a predetermined volume of water has been softened, the meter closes a control circuit that starts the motor, rotating the multiport valve into the backwash position. The backwashing continues at a constant and automatically controlled rate for a definite time interval after which a time switch starts the motor, rotating the multiport valve into the brining position. In this position water under pressure is supplied to the ejector and also to a diaphragm valve located in the brine suction line. The ejector operates, discharging brine from the measuring tank into the softener. After a specific volume of brine has been withdrawn from the measuring tank, a float switch located in this tank starts the motor, rotating the multiport valve into the rinsing position. The rinsing, like the backwashing, continues at a constant and automatically controlled rate for a definite time interval. At the end of that period the time switch again starts the motor, rotating the multiport valve into the original softening position.

It is reported that when present softeners are converted to fully automatic operation a more dependable and uniform supply of completely softened water is produced at a lower cost per thousand gallons.

Fig. 14 shows the Automatic Zeolite Softener.

Saturated brine is required for the regeneration of a zeolite water softener. Previously, it was the general practice to make up and measure this brine in a single tank called a "saturator." The Permutit Company now separate these two functions by using two tanks. This arrangement has many merits among which are the following:

1. A much larger quantity of salt is stored and drawn upon as required thus reducing the labor involved.

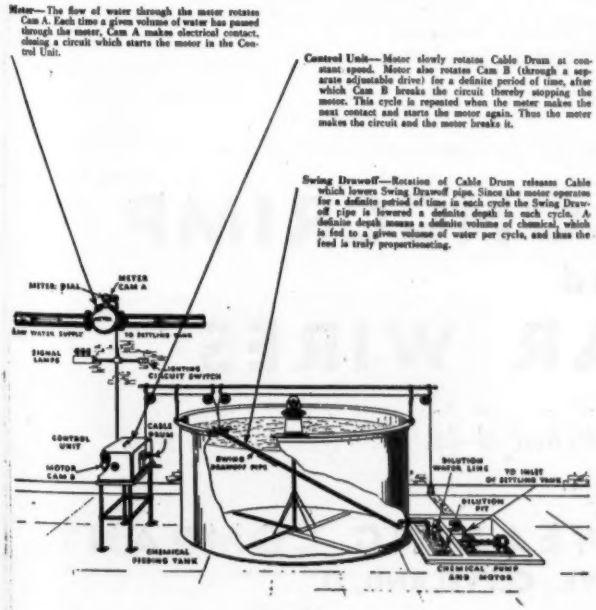
Meter—The flow of water through the meter rotates Cam A. Each time a given volume of water has passed through the meter, Cam A makes electrical contact, closing a circuit which starts the motor in the Control Unit.
Control Unit—Motor slowly rotates Cable Drum at constant speed. Motor also rotates Cam B (through a separate adjustable drive) for a definite period of time, after which Cam B breaks the circuit thereby stopping the motor. This cycle is repeated when the meter makes the next contact and starts the motor again. Thus the meter makes the circuit and the motor breaks it.
Swing Drawoff—Rotation of Cable Drum releases Cable which lowers Swing Drawoff pipe. Since the motor operates for a definite period of time in each cycle the Swing Drawoff pipe is lowered a definite depth in each cycle. A definite depth means a definite volume of chemical, which is fed to a given volume of water per cycle, and thus the feed is truly proportioning.
METER DISC
METER CAM A
RAW WATER SUPPLY
TO SETTLING TANK
SIGNAL LAMPS
LIGHTING CIRCUIT SWITCH
CONTROL UNIT
CABLE DRUM
MOTOR CAM B
SWING DRAWOFF PIPE
SOLUTION WATER LINE
TO INLET OF SETTLING TANK
DILUTION PIT
CHEMICAL FEEDING TANK
CHEMICAL PUMP AND MOTOR

FIG. 15

Diagram of operation Permutit electro-chemical feed. (The Permutit Co.).

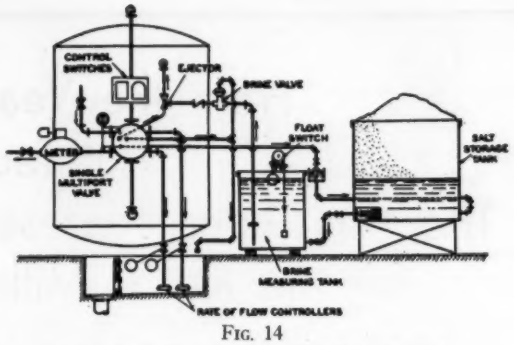

FIG. 14

Automatic zeolite softener. (The Permutit Co.).

2. Water is automatically fed to the saturator. This reduces the labor and insures an adequate supply of brine at all times.

3. Brine is *accurately* measured from a separate tank of small cross section. (With the old design, it was difficult to measure the brine draw accurately and consequently salt was often wasted.)

4. The salt is kept above the water level so that the amount in reserve is readily visible without using a measuring stick.

Existing saturators may be easily converted to this new design.

The new Permutit electro-chemical feeding mechanism is a simplified mechanism that can be used for accurately controlling the feeding of any desired chemical to a water stream. This mechanism is used in one of two general arrangements. In the one case, it is used to control the chemical treatment of waters which have a varying rate of flow. In this application, the control unit is operated by a make and break system, the frequency of which is governed by the rotation of an electric contact head on the water meter. A contact is made each time a definite quantity of water passes through the meter and for each contact a definite quantity of chemical is fed. This makes the feeding proportionate at all times to the flow of water being treated. In the other case, the mechanism is employed for treating waters which flow at a constant rate. In this application, the control unit is operated continuously while the water is flowing and is started and stopped by the same electrical means that controls the water flow. With either design the chemical dosage can be quickly adjusted by a finger-tip movement of the graduated scale.

This control mechanism is supplied in either the single or double drum type. It is a simple matter to convert a single drum mechanism to the double drum type at any time by attaching a second release mechanism.

Fig. 15 illustrates a typical assembly of this mechanism in conjunction with the other equipment necessary for feeding a chemical such as lime suspension in proportion to the flow of raw water. Where two chemicals are to be fed simultaneously in independently adjustable dosages, the double drum mechanism would be used in conjunction with a second chemical tank and drawoff pipe arrangement.

This is a precision feeding device of rugged, dependable construction, that can be used in a wide variety of applications and for the feeding of almost any chemical solution.

The use of phosphate in boiler water has for some time been recognized as an effective means for inhibiting embrittlement of boiler metal by the University of Illinois, boiler insurance companies and other authorities.

The Permutit Company is now offering boiler plant

From the Year 1935
subtract 1905
The remainder represents 30 Years of Service to the Paper Mills of this Country by

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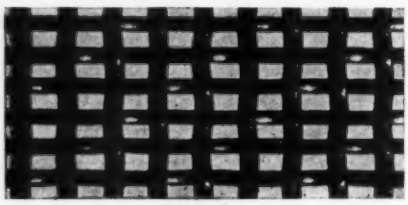
The Good Will created by the original Wires has been maintained by the thousands produced since then.

Constant Research has enabled this Company to meet the changing requirements caused by increased speeds and sizes of Paper Machines during the past three decades



Enlarged Photograph of Lindsay's Longcrimp Fourdrinier wire. Introduced to the Paper Mills in 1922.

We also specialize in

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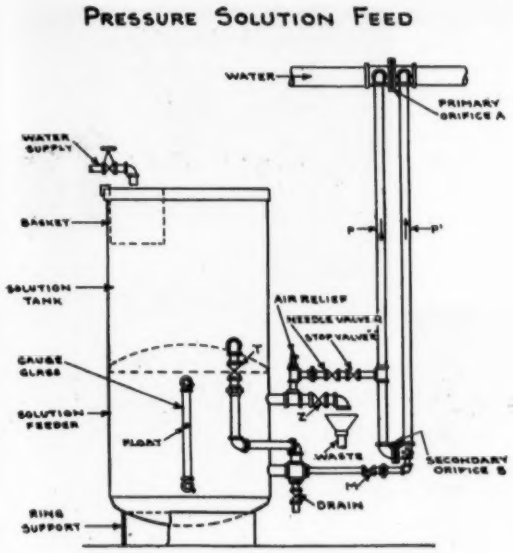


FIG. 16

Pressure solution feed. (The Permutit Co.).

operators an extremely simple and economical apparatus for feeding phosphate to zeolite softened boiler make up water for this purpose. This device illustrated in Fig. 16, is capable of feeding chemical in a predetermined dosage and in proportion to the flow of makeup water. The use of a primary orifice together with a means for the positive dilution of the chemical stream before it enters the feed water insures accurate operation at all boiler loads.

This device operates as follows: The makeup water flowing through primary orifice A causes a pressure drop in proportion to the flow. This forces some water through the primary shunt line P and its return P' thus creating a pressure drop across secondary orifice S. This in turn forces water into the top of the solution feeder displacing solution out of the feeder through P' into the makeup water. When the feeder is empty as indicated by the float, it is easily and quickly refilled from the solution tank.

b. Heating and Deaerating.

Nothing was submitted.

c. Pumping.

Worthington Pump and Machinery Corporation.

Fig. 17 shows a six stage, hydraulically balanced volute centrifugal pump designed for boiler feed service for pressures up to 1,000 pounds per square inch. This pump is unique in that each impeller is hydraulically balanced by

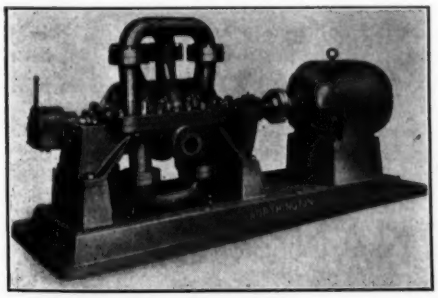


FIG. 17

6-stage hydraulically balanced boiler feed pump for pressures up to 1,000 lbs. per square inch. (Worthington Pump & Machinery Corp.).

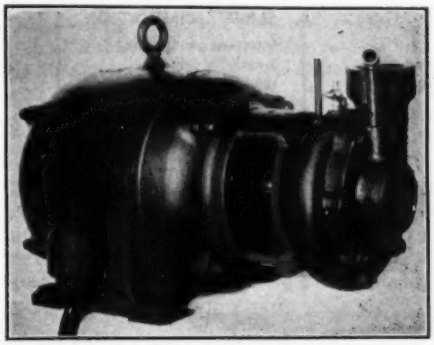


FIG. 18

Monobloc centrifugal pumps used for condensate service. (Worthington Pump & Machinery Corp.).

another impeller facing in the opposite direction and there are no balance drums or pressure breakdowns required to keep the pump in hydraulic balance. At the same time the stages are so arranged that there is not over one stage differential pressure across any leakage joint.

The casing is made up of a split volute for each of the impellers. These volutes are staggered in such a way that the radial thrust caused by the reaction of a volute on the impeller has been balanced. The combination of axial and radial thrust balancing is entirely new and the combination with the low differential pressure across stage pieces will make for increased life and longer maintained efficiency.

The design is further extremely simple in that there are no diffusion vanes and only three main parts; the lower half casing, the upper half casing and the rotating element. The design further makes use of external interstage loop which reduces the diameter of the casing permitting bolts closer to the centerline thereby making it possible to hold high pressures without excessive bolt stress. This combination with the simple design makes the pump easy to dismantle and reduces maintenance cost.

Fig. 18 shows a new development of monobloc centrifugal pumps used for condensate service. Such pumps are also used for chilled water as well as condensate pumps on vacuum refrigeration units. These pumps have proven to be exceptionally reliable vacuum service with extremely low submergence. The design incorporates a separate chamber or vent which permits the impeller to operate efficiently without vapor binding. A specially sealed stuffing box eliminates possibilities of air leakage at this point.

I—METERING.

Bailey Meter Company.

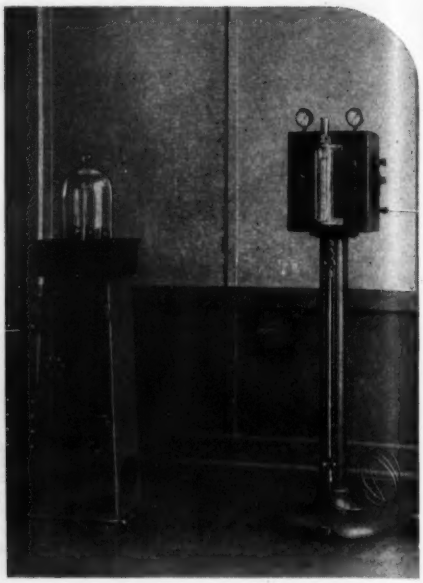
To supply the increasing demand of industrial establishments such as pulp and paper mills for higher boiler room economy, Bailey Meter Company, Cleveland, Ohio, has developed a new steam flow-air flow boiler meter particularly well suited to industrial service.

This meter records steam flow from the boiler, air flow supplied for combustion and flue gas temperature—all on one 12 inch diameter uniformly graduated chart. It also indicates steam flow on a porcelain enameled scale and integrates the total steam flow on a 6-digit counter which reads like an automobile mileage register.

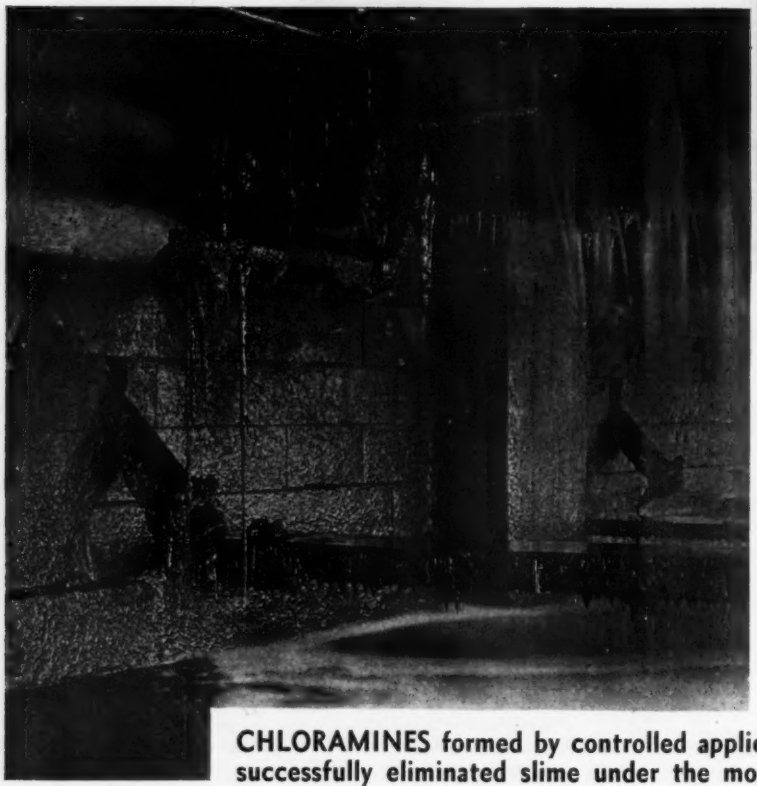
The three important factors of boiler operation—combustion efficiency, steam output, and flue gas temperature—are combined and coordinated in this one meter. It is equipped with the new direct-reading Bailey escapement type integrator; an accurate, sensitive air flow mechanism; a sturdy, dust and moisture proof pressed steel casing suitable for flush front or surface mounting; and a simpli-

SLIME ELIMINATION
increases production
lengthens felt life
reduces chemical costs
improves paper quality

SLIME ELIMINATION WILL
cut down clean up costs
overcome slime breaks
and effect production
economies that reflect in
increasing profits



Installation of this equipment (above) will prevent just such conditions as are pictured below (left)



An unretouched photograph of actual conditions in a mill not practicing slime control

CHLORINE + AMMONIA ELIMINATES SLIME

CHLORAMINES formed by controlled application of chlorine and ammonia have successfully eliminated slime under the most adverse conditions—at a cost of from 1½ cents-6 cents per ton of product.

From experience gained in over 150 of the country's leading paper mills Wallace & Tiernan Technical Staff are prepared to advise on slime control measures. Their recommendations involve no obligation. Full plant scale demonstrations may be arranged where desirable.

"Slime in Paper Mills—Its Origin and Prevention" — a report of investigations conducted by the W & T Technical Staff, will be sent to those interested. Ask for a copy (Research Pub. 327).

OTHER W&T CONTROL-SERVICES
Automatic pH control
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"The Only Safe Water Is a Sterilized Water"

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Manufacturers of Chlorine and Ammonia Control Apparatus
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fied, powerful steam flow mechanism with interchangeable head chambers.

The air flow mechanism provides for easy, quick and accurate adjustment to prevailing combusion conditions. It is sturdy in construction and powerful in operation, but yet possesses the same inherent accuracy and sensitivity which have established the Bailey Boiler Meter as the standard combustion guide in over 90 per cent of the large boiler plants in this country.

Simplicity, accuracy and flexibility are combined in the new steam flow mechanism by using a powerful Bailey Ledoux bell in conjunction with interchangeable mercury reservoirs. This construction eliminates the necessity of opening steam lines to replace orifices or flow nozzles when changes in meter capacity are desired.

In operation, the new Bailey boiler meter is a simple and thoroughly reliable combustion guide which any boiler operator can easily understand. It is simply necessary for him to adjust the boiler damper or fuel control until the records of steam flow and air flow coincide, one upon the other, on the meter chart. When this condition exists, he knows that the boiler is being operated in the most economical manner possible. In addition to guiding the operator, the permanent records made by the meter are of infinite value to the engineer responsible for boiler operation.

The record of flue gas temperature which is given by this meter is at all times a dependable check on the condition of the boiler baffles and on the efficiency of the heat transfer through the boiler tubes. It shows whether or not the heater surface is absorbing the maximum amount of heat possible at all times.

Because of the present day trend to the use of automatic combustion control in industrial boiler plants, the new Bailey Boiler Meter has been designed to fit into the Bailey meter control system.

A new meter to indicate and record both boiler water level and feed water flow has been developed by the Bailey Meter Company for use in boiler plants where it is desired to have both an indication and record of these factors on the operating floor.

This combination meter consists of a Bailey fluid meter which indicates, records and integrates feed water flow and records boiler water level, and a 12-inch indicator with a dial type scale for boiler water level. The indicator is mounted directly above the recording meter on a small feed water panel. If desired, this combination meter can be located on the individual boiler control panel.

For purposes of comparison, it is very valuable to have the records of feed water flow and boiler water level recorded on the same chart where they are coordinated as to time and can be interpreted easily without references to additional records or calculations.

Boiler water level being a factor which should be frequently checked by the operators, it is shown on the 12-inch indicator so that the exact position of water in the boiler drum may be easily determined by a glance at the indicating pointer. While it is desirable to provide a direct reading indicator for this factor, it is also very important to maintain a permanent and continuous record of the water level. This record is particularly valuable in the case of boilers with small water storage space where swell of water within the boiler drum occasioned by a sudden increase in load or the shrinkage of water occasioned by a decrease in load, may cause slugs of water to be carried over into the superheater or may cause the water level to drop so low that some of the tubes may be burned. In either event, a permanent record of boiler water level definitely shows water level changes which took place within the boiler drum, and is of great assistance in determining the exact source of erratic or faulty operation.

The Bailey Meter Company has developed a new potentiometer pyrometer which has been named "Galvatron" after the galvanometer-electronic relay circuit which it employs to operate slide wire resistances and recording pens.

One Galvatron may include as many as four potentiometer circuits, the contact making galvanometer being automatically switched from one circuit to the next by relays actuated from contacts made by a synchronous motor driven time device. One powerful synchronous motor drives these timing contacts for the relay as well as the galvanometer contacting mechanism, the recording chart, and the automatic standardizing relay contacts.

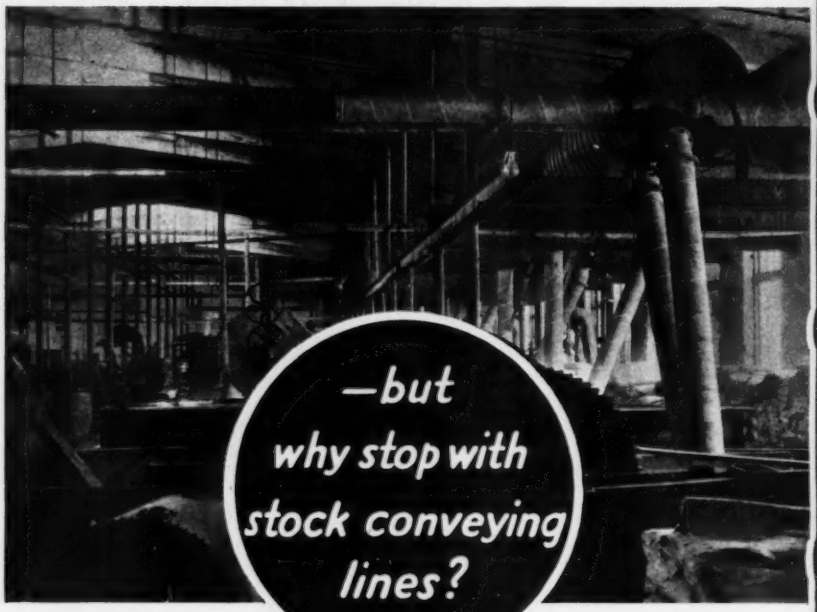
The Galvatron mechanism consists of a galvanometer arranged to make contacts of a duration proportional to to the deflection of the galvanometer needle from neutral. These contacts which close the circuit to the electronic relay, carry only a few micro-amperes of current, and are connected to the grids of Pliotron tubes. A galvanometer contact permits the flow of direct current through one Pliotron tube and the d.c. winding of its transformer whose second winding is in series with one field coil of a reversible synchronous motor driving the potentiometer unit. This flow of direct current permits a flow of alternating current through the transformer and field coil, thereby rotating the motor in one direction. Rotation in the opposite direction is produced in the same manner by energizing the other field coil through a second electronic relay when the galvanometer needle swings to the other side of neutral.

Split second operation of the reversing synchronous motors is obtained by the use of the Galvatron circuit, since the electronic relays act instantaneously in accordance with the galvanometer contacts.

Because of the very small current flow required to operate the electronic relay, it is possible to use light pressures on the galvanometer contacting mechanism without danger of burning. No failures to make contacts are experienced because of an increase in the resistance caused by collection of dirt or oxide at the contact points. A further advantage gained by the use of light contact pressure is the reduction of strain on the galvanometer needle and suspension ribbons. This permits the reduction of weight of the galvanometer needle thereby decreasing the operating period of the galvanometer and improving the speed of operation.

Automatic standardization takes place approximately every four hours at which time the dry cell is balanced against a standard cell. Contacts from the galvanometer properly amplified through the electronic relays, effect this balance by the adjustment of a motor driven resistance in series with the dry cell. A small indicator visible from the outside of the hinged panel on which the Galvatron mechanism is mounted shows the condition of the dry cell by a series of numbers, each successive number indicating that the dry cell is more nearly exhausted, until a red signal indicates that the cell should be replaced.

An outstanding feature of the Bailey Galvatron is its continuous record of records, up to four in number, made on a circular recording chart. When more than one record is provided for, each is made in a different color of ink, so that it can be distinguished from the others on the chart, regardless of how many times they cross each other. In the case of a multi-pen Galvatron recorder, all records are continuous, although the contacts made by the galvanometer needle are divided among the potentiometers. In the case of a one-pen recorder, all contacts made by the galvanometer serve to adjust the potentiometer, which in this case, is adjusted every four seconds if necessary.



FOR years Taylor Spiral Pipe has been rapidly gaining ground in many special applications like that illustrated above. However, it is just beginning to dawn on a number of industries that Taylor Spiral Pipe, as made today, is deserving of far *broader* application.

Check your piping requirements against the unduplicated combination of features that is found only in Taylor Spiral Pipe.

Do you want a light weight pipe? If so, remember that Taylor Spiral Pipe offers lighter weight than any other pipe of its strength. Conversely, if you require strength Taylor Spiral Pipe offers greater strength than any other pipe of its weight. You do not pay for an ounce of superfluous weight.

If durability is important, consider the fact that Taylor Spiral Pipe is supplied either heavily asphalt coated by the Taylor vertical dipping process, or heavily galvanized by hot-dipping.

With ability to withstand greater crushing, bursting or longitudinal strains than a seamless tube of equal gauge, there are few requirements for industrial piping that Taylor Spiral Pipe will not meet. A wide variety of joints and fittings meet every conceivable condition — and the increasing use of welding has still further broadened its utility. Ask for complete details.

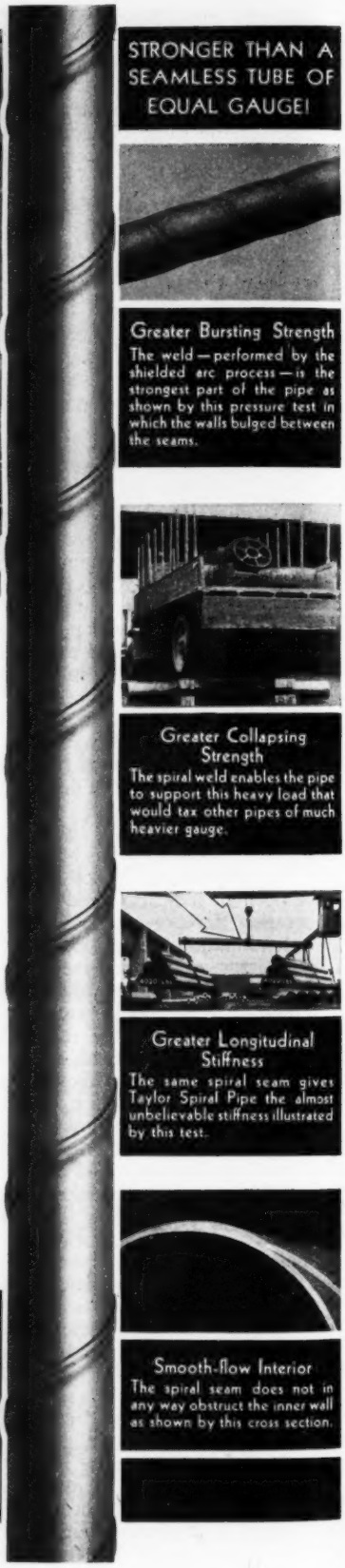
TAYLOR FORGE & PIPE WORKS

General Offices and Works, Chicago, Ill., P. O. Box 485

New York Office, 50 Church Street

TAYLOR SPIRAL PIPE

LIGHT WALL PIPE FOR ALL PURPOSES


STRONGER THAN A SEAMLESS TUBE OF EQUAL GAUGE!
Greater Bursting Strength
The weld—performed by the shielded arc process—is the strongest part of the pipe as shown by this pressure test in which the walls bulged between the seams.
Greater Collapsing Strength
The spiral weld enables the pipe to support this heavy load that would tax other pipes of much heavier gauge.
Greater Longitudinal Stiffness
The same spiral seam gives Taylor Spiral Pipe the almost unbelievable stiffness illustrated by this test.
Smooth-flow Interior
The spiral seam does not in any way obstruct the inner wall as shown by this cross section.

In the case of a four-pen recorder, each potentiometer receives a contact every 16 seconds, so that each record is a smooth conttinuous picture of existing conditions.

A new photo cell smoke density recorder compensated for variations in light source intensity and operated by the Galvatron electronic relay circuit, has been announced. This equipment consists of a receiving element in the form of an attractive recorder which is usually mounted on the individual boiler panel board and a transmitting element consisting of a projecting cylinder and a detecting cylinder which are mounted on opposite sides of the breeching or flue gas passage.

A continuous record of relative smoke density is made by the recorder on a 12-inch uniformly graduated recording chart. This record clearly indicates stack conditions at all times, night and day, showing definitely each period of tube blowing. Voltage variations or loss of incandescent lamp efficiency do not affect accuracy of the instrument.

A hinged panel within the dustproof pressed steel recorder casing provides the chart plate on one side and on the other side an easily accessible mounting for the sensitive galvanometer and electronic relays of the Galvatron. This recording Galvatron is similar in many respects to the Bailey galvatron potentiometer pyrometer.

The Foxboro Company.

The Foxboro Universal meter is one o fthe outstanding developments in the field of metering equipment for 1934. It is an ideal meter not only for the measurement of steam, but also for any fluid under any industrial condition. This meter has been designed so that it can be applied to every type of metering problem from the simplest to the most complicated. With the universal meter you need only have exactly what you require.

For instance, your problem may call for a simple recording flow meter. There is a universal meter that will give outstanding service on such a job. However, should you require pressure compensation, a direct-reading integrator, a recording integrator, or temperature and pressure records on the flow chart, you can have these without paying for additional design.

With a meter of this type, it is possible to record on one chart, the most important variables affecting the efficiency of boiler operation and with the aid of these records it is possible for the operator to obtain a greater degree of efficiency for his boilers.

For the convenience of reading the meters at a distance, we have attached a highly visible celluloid scale so that a pointer on the flow pen shows clearly the exact reading of flow at any instant.

Leeds & Northrup Company.

The new Micromax pressure recorder is excellent for measuring pressure in one place and recording it at any distance up to a few thousand yards away. By using a re-transmitter, distances of hundreds of miles can be covered. This Micromax uses a bourdon tube to vary the voltage output of a transformer in proportion to variations in pressure; the recorder, measuring voltage, is calibrated in pressure. The equipment operates entirely on 110 volt, 60 cycle supply, with no rectifiers, batteries or voltage regulators. Any range within bourdon tube limits can be supplied.

Paper mill executives have long wanted a more accurate means for translating into flow measurements the pressure difference across a primary element; it is now our privilege to announce the new L&N centrifugal flowmeter, which accomplishes this result. Using a principle new to flowmeter design, it sets a new standard of accuracy, and can lead to new and very great savings in determining the efficiencies of large power-generating and power-using machines. It has never been publicly shown to the engineering profession, but everyday use for two years in several large power plants has amply proved its desirability.

Republic Flow Meters Company.

The Republic mechanical flow meter is an extremely simple and accurate flow metering device, designed primarily for those installations where remote registration is not required. The entire instrument is assembled on a steel panel which can be easily mounted on a pipe, wall or table.

The reading instruments, indicator, recorder and integrator are calibrated to read or record in terms of flow. The recorder can be had separately or in combination with the integrator and/or indicator. The instruments are flush mounted with cast aluminum bezels of modern design.

The integrator is of the cyclometer type, registering in pounds or gallons, the total flow through the line. It is a simple integrating mechanism driven by a synchronous motor which at intervals of 15 seconds, adds on the counter the flow through the pipe during that period.

The meter body is a simple "U" tube, balancing a column of mercury against the differential pressure caused by the flow of a fluid through an orifice installed in the line. The rise and fall of the mercury positions a large float located in the high pressure chamber. The float in turn positions the recorder pen arm in direct relation to the changes in mercury level. A check valve has been provided to prevent sudden surges in the line from blowing the mercury out of the meter body.

The meter body is so designed that the range can be easily and conveniently changed by merely placing the range tube with a tube of proper size. The range tubes are interchangeable and made in three sizes corresponding to low, medium and high differential pressures.

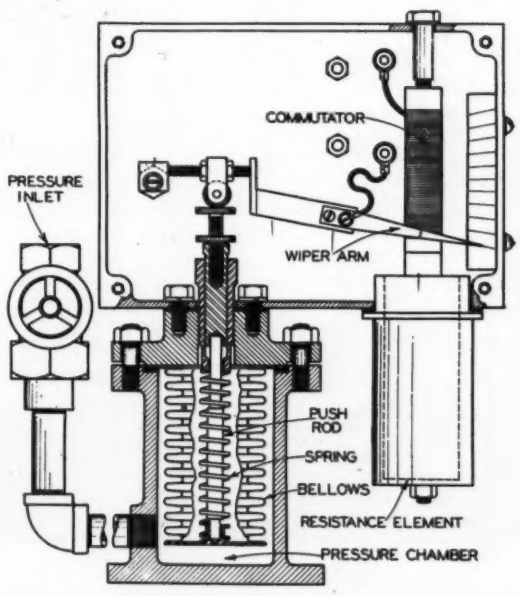
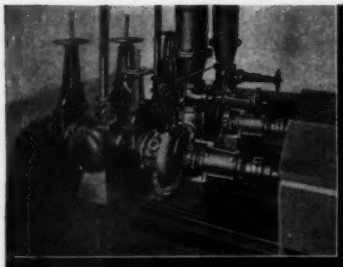


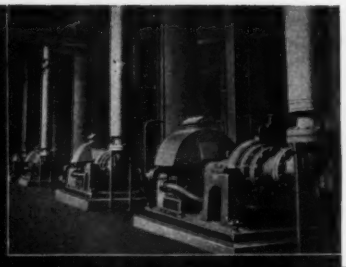
FIG. 19

Sectional front view of liquid level and pressure gauge body. (Republic Flow Meters Co.).

Through a Modern Paper Mill with Allis-Chalmers . . .

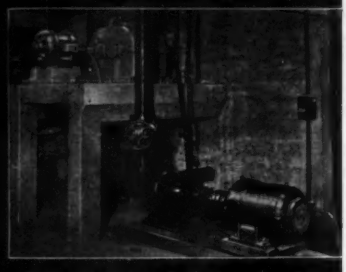


12"x10" SSOR Stock Pumps handling stock from blow pits to storage chests.

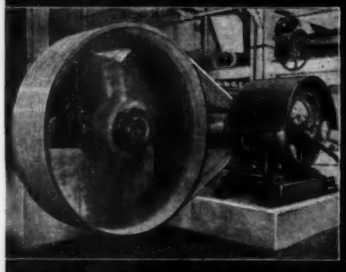


8" x 6" SSA Acid Circulating Pumps handling sulphite cooking acid.

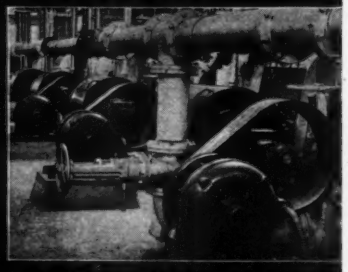
450 hp Synchronous Motors driving Jordans in Southern Paper Mill.



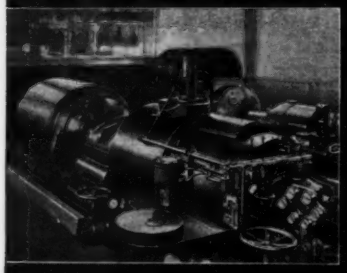
Standard Squirrel Cage; Enclosed Fan-cooled Type Motors.



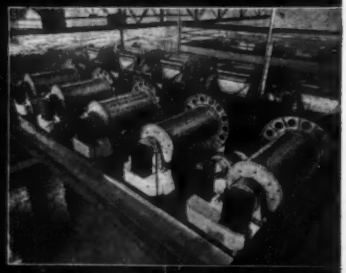
150 hp Allis-Chalmers Motor and Texrope Drive operating beater.



Allis-Chalmers Motors and Texrope Drives operating stock screens.



Allis-Chalmers Automatic Extraction Steam Turbine Unit in a Paper Mill.



Allis-Chalmers Rod Mills preparing pulp stock in Southern Paper Mill.

Pumps Type SSOR pumps were especially designed for pumping paper stock. Because of their sturdy, balanced construction and high efficiency, they have lowered pumping costs. Other Allis-Chalmers paper mill pumps include the Type SSA for handling digester acids, Type S for general water supply, Type SSU close-coupled motor-pump units and Type M multi-stage pumps.

Motors Allis-Chalmers builds motors for every type of paper mill drive above 1 hp. This includes not only standard induction, synchronous and direct current motors, but motors with electrical and mechanical modifications to suit the drive, such as fan-cooled, splash-proof and drip-proof types. The larger motors include those for operating grinders and direct current paper machine drives.

Drives Texrope Drives are used in every part of the paper and pulp mill, operating beaters, rod mills, screens, jordans, calenders, pumps, chippers, barkers, and other machines. Texropes are the ideal paper mill drives as they are unaffected by moisture; starting and acceleration are smooth; and they require no belt dressing, greasing or oiling. Texrope Drives help maintain steady production through steady performance.

Other Machinery Allis-Chalmers also builds other machinery for paper mills such as rod mills for the preparation of pulp, Thorne barkers, perforated metal, vibrating screens for wood chips, rotary lime kilns, and rotary compressors and vacuum pumps. Power plant equipment includes steam and hydraulic turbines, condensers, generators, switchboards, generator voltage regulators, and auxiliaries.

ALLIS-CHALMERS

— Allis-Chalmers Manufacturing Company, Milwaukee, Wisconsin, U.S.A. —

For static pressures or liquid heads the transmitter or gage body of the remote type liquid level and pressure gages shown in sectional front view, Fig. 19, consists essentially of (1) pressure chamber sealed at upper end by metal bellows extending within it, (2) pointer mechanism acting as wiper on (3) commutator which varies electrical resistance. Where differential pressure is involved (as in measuring water level in boiler drums and other pressure vessels) the transmitter is a standard Republic flow meter body of the proper differential pressure range and static pressure capacity.

In the new type of transmitter the static pressure is admitted at the bottom of the bellows chamber, to the outside of the bellows, and is opposed by a coiled spring inside the bellows. The motion of the bellows, proportional to the static head, is transmitted by means of a push rod to a wiper arm traveling across a commutator consisting of a pile of alternate copper and insulating discs. The resistances to which the copper disks are connected are wound cumulatively in such a way that the total resistance to each contact is measured during construction. The standard model gage body is used for heads from 10 to 200 feet of water. For overhead tanks, etc., suppressed-zero models are available. Signal and control models, too, are announced, for commanding automatic pumps, etc., their mercury-switch capacity being 10 amps. at 110 volts. Other models are available for extremely low heads of liquid, for gas pressure remote-reading and signaling, etc.

The remote reading instruments may be either indicating and/or recording and may be placed any distance from the point of measurement.

The Republic electrical flow meter has been redesigned and new engineering features are embodied in the method of assembling and actuating elements in the various reading instruments. The new design is built around the "cartridge sealed element," which consists of the actuating unit designed and built to fit into a metal cartridge, forming a compact, sturdy element ready for mounting on the instrument panel. There are three types of reading instruments, the indicator, the recorder and the integrator, each with its actuating mechanism mounted in a separate cartridge sealed element, which is interchangeable and may be easily removed from the back of the panel. The metal cartridges protect the elements from dirt, moisture and abuse.

This new principle of mounting each actuating unit as a separate element simplifies the entire meter assembly. The simplification has been carried through the entire line of Republic reading instruments, including the two and three pen multiple recorders which combine records of flow, pressures, temperatures, etc., on one chart.

The pen adjustment is accessible from the front of the instrument, the pen is automatically lifted from the chart when the chart knob is unscrewed and the chart knob is part of the pen release assembly and is always held in position. The accuracy of the integrator is not dependent on, nor affected by, the clock mechanism and operates independently of other reading instruments.

A new boiler horsepower indicator has been introduced, known as the "GS-24" indicator. It has a 24-inch porcelain enamel dial with large white figures on a black enameled field, so that it may be easily read from a distance.

By placing the scales horizontally, as can be done wtih the new type of actuating unit, any number of units of draft or pressure can be had without increasing the width of the instrument. This is of advantage where mounting space is limited or where it is desirable to mount the instrument on a column or pedestal.

Each draft or pressure element is a simple, compact, interchangeable unit operated by a sensitive bellows type of diaphragm. This diaphragm is made of alum tanned, colon leather with the center area held rigid by a pair of aluminum discs. These discs are supported in a vertical position by means of a long two-point pivot bearing through which the movement of the diaphragm is transmitted to the actuating lever.

This construction relieves all of the supporting strain from the diaphragm without increasing the friction in the moving system. The diaphragm chambers are made round in order to avoid wrinkles in the leather.

The indicator is supplied in all standard ranges of draft and pressure in any desired combination from 2 to 16 units.

Fig. 20 shows the above draft indicator.

C. J. Tagliabue Manufacturing Company.

We have developed this past year a full line of electrical instruments of the potentiometer type for indicating, recording, and controlling temperature.

J. CONTROL.

a. Feed Water Regulation.

Nothing was supbmitted.

b. Pressure Regulation.

Hagan Corporation.

During the past year, the Hagan Corporation has developed a steam pressure reducing station which should be of especial interest to the pulp and paper industry. The unit is simple in construction, sensitive and accurate in operation, and can be installed easily. Since the requirements of the many pressure-reducing problems in a paper mill may vary widely with respect to the pressure to be maintained and the volume of steam to be reduced, this device is admirably suited to such service.

The control station consists of two parts—the "master

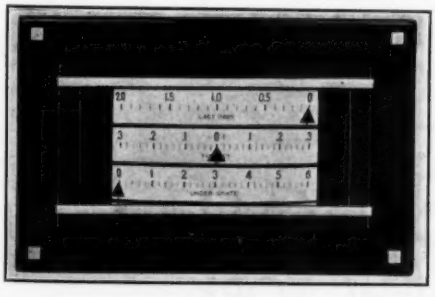


FIG. 20

Republic multi-point draft and pressure indicator. (Republic Flow Meters Co.).

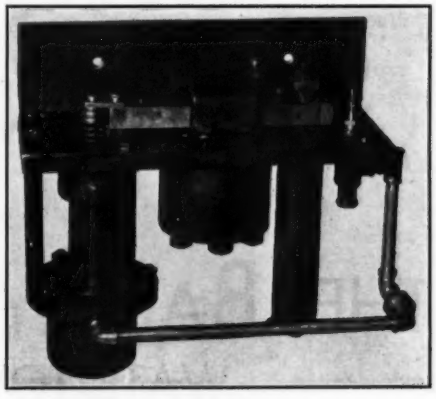
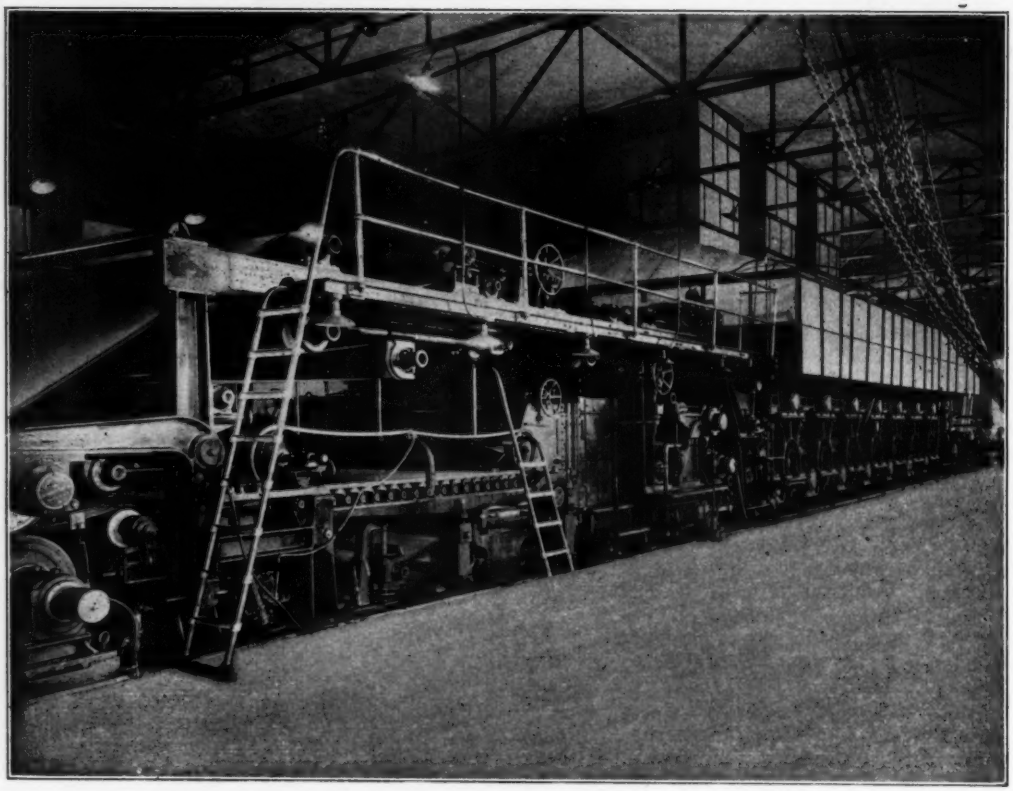


FIG. 21

Master sender with cover removed. (Hagan Corp.).

A 176" Paper Machine

for making tissue papers



A 176" HARPER MACHINE BUILT FOR MOYER AND PRATT, INC., LYONSDALE, NEW YORK.

MODERNIZED OPERATION
WIDTH — SPEED
ECONOMY — QUALITY

THE BAGLEY & SEWALL CO.
WATERTOWN — NEW YORK

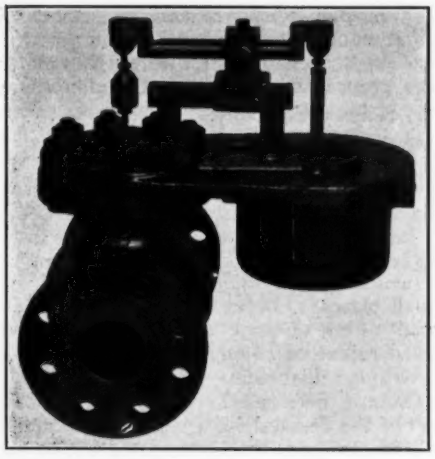


FIG. 22

Bellows operated steam control valve. (Hagan Corp.).

sender" shown in Fig. 21 and the steam control regulating valve shown in Fig. 22. The "master sender" is responsive to variations in steam pressure, and any departure from the desired value of the pressure to be maintained causes the master to vary a "sending line" air pressure. This "sending line" pressure communicates with a metal bellows mounted on the steam regulating valve. (See right hand side of Fig. 21.) This bellows is large and powerful and actuates the valve in direct accordance with the action of the "master." For a full stroke of the valve, a force of 400 pounds is available, and since the valve is of the balanced type, ample power is secured for positive, accurate and speedy regulation. The rocking arm between the bellows connection and the valve stem is provided with an adjustable fulcrum. Thus, a full stroke of the bellows is always available and utilized for whatever maximum lift of the valve is required to give the greatest steam flow desired. This provides flexibility of adjustment under the various conditions, and also assures sensitive and accurate regulation at all times. A single supply of compressed air provides the power and "impulse" transmission media, so that little pipe work is needed for installation. The "master" can be located close to the point at which constant pressure is desired and the valve can be mounted at a distance, or whever it is convenient, with quarter inch pipe connection between the two units.

The apparatus is rugged in construction, requiring little attention. It is fast and stable in operation and gives excellent regulation under the most adverse conditions.

The Swartwout Company.

The Swartwout Type CPQM Master Control was developed primarily for the paper industry where accurate pressure control is essential and where frequent adjustments are necessary to provide the correct pressure for the various grades of paper manufactured. The same advantages of rapid adjustment and accurate pressure control are also apparent on any installation where it is necessary to accommodate operating conditions.

In operation the Type CPQM master control utilizes the principles of Swartwout S-C master regulators which have been widely used in power plants for years. New features and refinements, however, are offered for the first time in this new master control. The equipment consists of the pressure regulator to which is attached a small calibrated indicating dial, and the two main pressure gages, all enclosed in a sturdy tamper-proof case. A removable

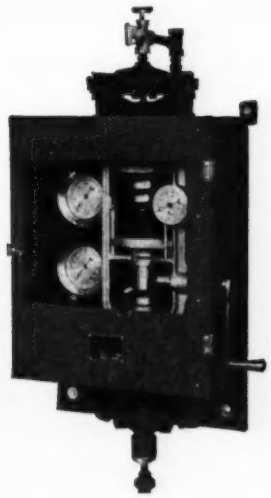


FIG. 23

Type CPQM master control. (The Swartwout Co.).

crank is used in adjusting the pressure. A turn of this crank sets the hand on the small dial to the desired pressure which is automatically set up and accurately maintained.

Thus this equipment affords a means of remote control without disadvantages of cables, chains or electrical equipment. It is now in successful operation in a number of large paper mills through the nation.

Fig. 23 shows this control unit.

c. Boiler Water Level Regulators.

Nothing was submitted.

d. Desuperheater Control.

Nothing was submitted.

e. General Automatic Control.

The Swartwout Company.

The Thermo master regulator is used to control the temperature of steam after it has passed through a reducing and desuperheating station.

The Swartwout thermo master regulator consists of a thermostat made up of two different pieces of metal having different co-efficients of expansion. The operating element of the regulator is inserted in the steam line on the outlet side of the desuperheater. The power thus developed is transmitted through a lever to a three-way valve. This three-way valve admits pressure to or relieves pressure from the main diaphragm operated valve controlling the water supply to the desuperheater. It is built for controlling temperatures as high as 1000 deg. F. and incorporates special safety features for protecting working parts in event of failure of water supply to desuperheater.

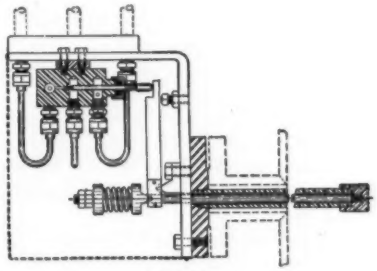


FIG. 24

Thermo master regulator. (The Swartwout Co.).

All working parts are fully encased yet easily accessible for adjustment.

Primarily, the Swartwout thermo master regulator was developed to control temperatures in the higher range, 500 degrees and above. Its success in this particular field makes it highly desirable for the accurate control of temperatures in the lower range also. It can be used on any temperature control system where one large or a number of valves may be in operation and where it is essential that accurate temperatures be maintained.

Fig. 24 shows this regulator.

f. Automatic Frequency and Load Control.

Leeds & Northrup Company.

Micromax round-chart frequency recorder is at once a bold frequency indicator and a recorder of the larger fluctuations. Where the superior detail recorded by Speedomax or Micromax strip-chart recorders is not needed, this machine very substantially reduces the instrument investment.

Speedomax high speed frequency recorder is the fastest non-photographic recorder we know of. It is several times as fast as conventional Micromax frequency recorders, and shows many more details of frequency fluctuations at such times as the instant of a load change. It thus provides data on which closer control can be based.

The new L&N frequency control biased for tie-line load enables two stations to participate in frequency control of a system, without the use of pilot wires between them. The equipment also can put the frequency regulation on to those stations that serve the area in which fluctuations originate.

g. Fuel Gas Control.

Nothing was submitted.

II. Steam Distribution

A. Piping Valves and Fittings.

Crane Company.

For the past few years developments in the valve and fitting field have been rather along the lines of new and improved materials rather than in new designs. Thus, Crane Co. at the present time is making use of upwards of forty different alloys and metals in making its regular products. Valves and fittings are regularly being made in 18-8 chrome nickel alloy, Ni-Resist, aluminum, 12 per cent chrome, 4 to 6 per cent chrome-molybdenum, Everdur, herculoy, Monel, nickel, and a variety of other metals; all having specific use in the process industries. In addition to the valves made completely of alloys, we have spent a great deal of time in laboratory research in developing new materials having specific application in valves for seats and discs and stems.

Thus, it can be seen that the trend has been along metallurgical lines in our industry rather than along design. The ultimate consumer of valves and fittings is becoming increasingly conscious of the value of specifying high-grade materials with first cost as a secondary factor, and we are concentrating our efforts upon the production of standard items which will have increased service life.

Homestead Valve Manufacturing Company.

One of the most recent developments made by this company is in connection with the "Hovalco" and the combination "Hovalco Homestead" boiler blow off valves for higher pressure service. A lift type plug valve is used constructed of cast steel with monel metal trimmings which has many advantages. It is made for pressures of 600 pounds and over.

The E. F. Keating Pipe Bending Company.

Report no new developments helpful to paper industry, but report that the Van Stone joint is still the most popular type of connection for high and low pressure service piping and while there is a tendency in some instances to do more welding work, it is still considered better practice not to weld on the high pressure lines where this material can be built and ordered fabricated to exact dimensions.

The M. W. Kellogg Company.

This company has developed a method of producing corrugated bends and tangents, which have a flexibility ratio of five to one compared to plain pipe bends of equal overall dimensions. This is an important development due to the fact that modern power and process installations due to higher temperatures and pressures are requiring increased facilities for taking care of thermal expansion in very small places. Corrugated bends can be pulled on radii as small as one and one-half nominal pipe diameters. The standard radius of corrugated pipe bends is equal to three nominal pipe diameters.

The addition of the creased type of bend has been made to take care of the demand for a bend which could be used in a slightly larger space than corrugated bends, but which would not require as much space as plain bends, and which would not cost as much as the corrugated pipe.

The Wm. Powell Company.

Reviewing recent developments of valve design and materials for high pressure, high temperature steam service—considerable research has been conducted on various seating materials. For temperatures in excess of 500 deg. Fahr. it is advisable to resort to an alloy capable of withstanding high velocities of steam. Such alloys must necessarily resist abrasive action as steam, having a tendency to impinge directly on the valve seat and disc faces, tends to rapidly erode the faces.

It has been our experience recently that for temperatures which are much above 500 deg. F. one of the synthetic types of monel metal—such as the high silicon heat treatable alloy—or Monel Mental to which a goodly percentage of tin has been added; or stainless steel (approximately 11½ to 13 per cent chromium content with a .12 per cent maximum carbon content) suitably hardened, work satisfactorily.

After two years of research work in addition to abrasion tests on various alloy materials suitable for valve seats and discs, we have definitely concluded that for still higher temperature service there is no material superior to Stellite. Stellite is an alloy composed principally of chromium, cobalt, and tungsten. It is available in three different grades suitable for welding directly to the base material of the valve seat or disc. The proper welding procedure can be accomplished in such fashion to give an inseparable bond between the base material and the Stellite. The following factors are characteristic only of Stellite: the material maintains high ductility at high temperatures; it does not have a tendency to seize, gall, or bind when in contact with other materials.

Tests definitely indicate that for valve seats and discs combinations such as Stellite against Stellite, Stellite against high silicon Monel Metal, or Stellite against a very hard cutlery type (high carbon) variety of 11½ to 13 per cent chrome iron are superior to other materials.

Where the average life of valves for blow down service may be just a few weeks, such valves when trimmed with Stellite will retain pressure tight contact between the seat and disc for a year or more.

Certain globe type valves have been constructed in recent years which, although suitable from a service standpoint, offer much restriction to the flow through the valve. This has been mitigated by modifications of certain existing designs.

Plug type seats and discs are used where there is a sliding action or throttling below the capacity of the pipe.

Developments in the last few years have also been made on various alloy steels from which the valve bodies, bonnets, and yokes are to be supplied. Long time creep tests have proved actual characteristics predicating the life of such parts in constant temperature and extreme service conditions. As for limitations on carbon steel, it is advisable to stay well within the 800-850 deg. F. range. Slightly above these temperatures there are certain other alloy constituents which tend to make a more suitable material at these high temperatures. Such alloy steels as carbon-molybdenum; nickel-chromium-molybdenum; chromium-molybdenum; and chromium-tungsten steels are well suited for these high temperatures.

Research work has also been conducted to prove the weldability of cast steels in order to build cast steel valve bodies which when welded to steel tubing or piping will offer the utmost in physical characteristics of the welded sections. Moreover, considerable effort has been applied in the production of a suitable valve with welding ends for temperature and pressure service. In producing valves with welding ends it is advisable to limit not only the carbon content of the steel but also other constituents, such as chromium, which tend to increase difficulty in obtaining solid, homogeneous sections through the weld. These welding end valves, we believe, will find considerably more favor within the coming years. Improvements in materials and designs in general tend to promote their use.

Henry Vogt Machine Company.

Developments and improvements were made this past year on our complete line of drop forged valves and fittings for all purposes.

Walworth Company.

The most notable development of Walworth Company this past year has been the introducing of a threadless bronze fitting in both standard and extra heavy patterns. These fittings are known as Walseal Fittings. The Walseal joint is stronger than the materials being joined.

In the place of the ordinary threads, there is a bored out chamber in the middle of which there is a rectangular groove carrying a brazing alloy as part of the fitting. In making up this joint the brass or copper pipe is cleaned and inserted to the shoulder, such shoulder being approximately at the end of what would ordinarily be the thread chamber in a regular threaded fitting. All tests which have been conducted have failed to break the joint and any failures occurring under test appear either in the pipe or fitting.

This fitting is designed primarily for use with iron pipe size brass pipe, but if economy demands it also can be used with copper tubing, provided of course, this tubing maintains the same outside diameter as iron pipe size pipe.

The melting point of the brazing alloy being approximately 1300 degrees permits the use of Walseal fittings under any temperature to which bronze fittings would be ordinarily considered.

Valves as well as fittings are available with the Walseal joint.

B. Accumulators.

Foster Wheeler Corporation.

An exceedingly interesting installation of a steam accumulator has recently been made in conjunction with electric boilers, which in turn supplanted coal burning boilers. The original installation consisted of—

15—333 horsepower, 150 pound pressure, powdered coal boilers, maximum rating 180 per cent.

2—120 horsepower, 150 pound pressure, hand fired boilers, maximum rating 150 per cent.

1—300 horsepower, 150 pound electric boiler, maximum rating 150 per cent.

With this installation the steam load fluctuated from 130,000 pounds per hour to 180,000 pounds per hour. The new equipment includes 3 electric boilers of 30,000 kw., one for standby, designed to evaporate 3.16 pounds per kilowatt at 90 per cent efficiency.

In conjunction with the electric boilers a steam accumulator was installed with a capacity of 15,000 pounds within a pressure range of 200 to 110 pounds per square inch. The steam load with the accumulator to balance it is 155,000 pounds per hour and the boiler efficiency with the accumulator is from 94 to 95 per cent due to the reduced blow-off and elimination of load fluctuation. Foster Wheeler heat recovery equipment in the shape of blowdown exchangers make the overall efficiency between 97 and 97.5 per cent.

C. Heat Exchangers.

Foster Wheeler Corporation.

The great variety of heat exchangers and heat recovery devices applicable to paper mill work covers a subject too broad for more than general comment. Much difficulty with plugging of heat exchangers due to solid matter may be overcome through the use of open heaters and vacuum flash tanks. Studies of individual conditions are usually necessary before definite recommendations can be made and suitable design submitted.

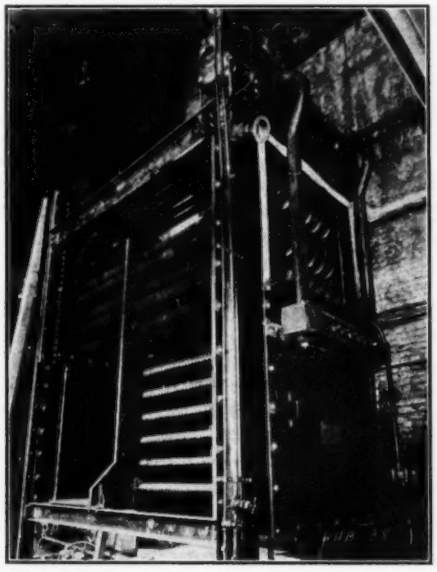


Fig. 25

Waste heat boiler 1000 sq. ft. of heating surface. (Foster Wheeler Corp.).

For difficult conditions, heat exchangers with expanded tubes are in successful daily service, expansion joints frequently being built into the shell. Quick opening heads to facilitate cleaning have been well developed and for high pressure work lockhead heaters have proven eminently satisfactory up to 1500 pounds pressure. This arrangement eliminates the use of large bolts and long wrenches, making it possible for one or two men to dismantle and assemble a head with ordinary hand wrenches in a few hours.

Fig. 25 shows a waste heat boiler operated by the Institute of Paper Chemistry in connection with a sulphite mill. The boiler has approximately 1,000 square feet of heating surface.

Henry Vogt Machine Company.

Numerous installations of heat exchangers were made during 1934. These installations consisted of various types and arrangements of heat exchanger apparatus.

III. Steam Power

A. Turbines.

a. Paper Machine Drive.

Nothing was submitted.

b. Miscellaneous Mechanical Drives.

General Electric Company.

The development of mechanical drive turbines was along lines that extended the field to which they may be applied, especially in the production of a design permitting extraction or mixed-pressure operation.

The new units embody all the refinements of design incorporated in the larger units, but on a reduced scale. The extraction and mixed-pressure units, like the simpler mechanical drive turbines, may be used to drive any rotating apparatus. A new bearing, lubricated by an oil ring, permits shaft speeds far in excess of those for which oil-ring lubrication has heretofore been suitable.

B. F. Sturtevant Company.

Where process steam can be used to advantage Sturtevant turbines, gears, and fans are installed to very great advantage. We have developed an automatic control on the Sturtevant turbines which is actuated by the combustion control. This turbine control is so designed that it follows the fan law, namely, that the horsepower varies as the cube of the speed. This control is operated by a series of cams which open and close each individual nozzle in accordance with the demands of the main steam load.

c. Generator Drive.

General Electric Company.

A 15,000-kw. noncondensing turbine generator will be installed to operate on 1200-pound 900 deg. F. steam. It will furnish process steam to the Ford factory at 250 pounds pressure.

A 10,000-kw. 3600 r.p.m. noncondensing turbine generator was installed for the Firestone Tire and Rubber Company which operates under steam conditions of 1200 pounds pressure and 750 deg. F. total temperature.

A 10,000-kw. 3600 r.p.m. noncondensing unit for the Diamond Alkali Company operates on steam conditions of 725 pounds pressure, 800 deg. F. total temperature, and provides exhaust steam to the factory.

B. Steam Engines.

Ferguson Engineers.

In steam engines we have accomplished much research and development work in the way of higher speeds, lighter weight, smaller space occupied per unit of capacity, higher efficiencies and lower investment required.

These new designs will occupy only a fraction of the space formerly occupied and will compete with steam turbines in this respect.

The higher speeds of 600 r.p.m. and over for 1000 kw. sizes fits these engines for new applications, new services and new fields not before considered available for steam engines.

These engines are suitable for any steam pressures and extreme steam temperatures, have remarkable thermal efficiencies and are particularly adapted for back pressure operation, such as is required for paper mills and similar fields, where condensing units are seldom necessary in power generation.

C. Condensers and Auxiliaries.

Foster Wheeler Corporation.

The modifications in surface condensers and auxiliaries consist chiefly in small improvements and in careful design to insure installation that will facilitate easy operation and low maintenance. A recent installation is at the Fort Howard Paper Company where there are two Foster Wheeler surface condensers, previous one of 1500 square feet and new one of 2900 square feet. Independent circulating pumps are provided. Both condensers have duplicate discharge piping so that in summer all condenser water goes to waste but in winter to the mill.

IV Hydraulic Power

A. Dams, Forebays, Reservoirs, Etc.

Nothing was submitted.

B. Penstocks, Gates, Valves, Mechanical Racks.

Newport News Shipbuilding and Dry Dock Company.

We have been awarded contracts for equipping five plants with mechanical rack rakes during the year. These include equipment for the Madden Dam plant in the Panama Canal Zone. We now have about 120 such rakes in operation.

S. Morgan Smith Company.

In 1934 the company completed installation of the eleven roller gates at Dam 15 in the Mississippi River between Rock Island, Ill. and Davenport, Iowa. This project required 3800 tons of material for the gates alone. Each gate provides a clear spillway width of 100 feet between piers; the nine intermediate gates provide a damming height of 26 feet above the fixed crest of dam, and the two end gates of damming height of 21 feet 9 inches. These gates are similar in design to the two at Wallenpaupack, Penna., each 67 x 14 feet, the two at Lewiston, Idaho, each 105 x 18.5 feet, and the two at Bellows Falls, Vermont, each 115 x 18 feet. The larger roller gate system at Dam 15, however, has probably been mainly responsible for the present widespread interest in the use of roller gate dams for power purposes, and for navigation of inland water-ways.

Three roller gates, each having a clear width of 60 feet and a damming height of 20 feet, have been designed and fabricated, and are now being delivered for installation at Dam 20 in the Mississippi River near Canton, Missouri. These gates require 500 tons of material.

Other orders were placed during 1934 for large gate equipment on the ten direct lift gates for Montgomery Dam in the Ohio River and on the five submergible roller gates for Dam 6 in the Mississippi River. The gates for Montgomery Dam differ from the roller gate system in that they require hoisting units at each end, and operate on roller trucks. Twenty operating units each comprising a 150,000 pound capacity spur reduction hoist and a multiple link chain, and twenty roller bearing trucks, all weighing approximately 475 tons, were supplied for this project. The roller gate plans for Dam 6 are now being prepared in our works, and materials amounting to 350 tons will be supplied. These materials will be represented in operating units and in heavy cast steel spur rims and spur racks on which the gates will roll.

A large number of Rotovalves were manufactured and installed. These valves are of the tapered plug type, and absolutely tight when closed, and when in the open position, there is a minimum of friction loss, the friction head being practically as small as for the same length of straight pipe. Eighty-six installations were manufactured, varying in size from 6 to 36 inches in diameter. Some of the valves are for manual and some for automatic operation. The automatic valves were designed and installed for the control of pressure, velocity, or volume. The valve seats were so located in the body that they do not come into the direct flow of the liquid and therefore pitting, scouring or wire-drawing does not occur. They were de-

signed for easy operation under unbalanced pressures without a bypass, the entire load being taken on the bearings after unseating.

The valves manufactured were for installation in water works, sewage disposal systems, paper mills, and other industries.

We are also building at the present time four pressure regulators or relief valves for the 115,000 horsepower turbines at Boulder Canyon. Each regulator is designed to discharge not less than 2080 c.f.s. at 475′ head. The maximum operating head is 590 feet. These are the largest turbine pressure regulators in physical dimensions and in discharge built to date. The completion of the final designs was preceded by numerous tests and comprehensive research.

C. Turbines, Waterwheels, Governors.

Baldwin-Southwark Corp., I. P. Morris Division.

During the year 1934 the Baldwin-Southwark Corp., I. P. Morris Division, have secured contracts for hydraulic turbines for the following installations:

1—Great Northern Paper Company, Millinocket, Maine. This contract covers three vertical shaft, propeller type turbines for the North Twin Development of the Great Northern Paper Company, near Millinocket, Maine. Two of the turbines are of the fixed blade propeller type, each rated at 3050 h.p. under a head of 28 feet at a speed of 171.5 r.p.m. The third unit is of the adjustable blade propeller type rated at 3250 h.p. under a head of 28 feet at a speed of 171.5 r.p.m. The two different types of turbines were selected for this plant in order to take care of the variations in load in an efficient manner. The two fixed blade propeller type turbines are operated at constant load at their point of best efficiency and the load changes in the plant are taken care of by the adjustable blade turbine due to its characteristic flat h.p. efficiency curve, as this type of unit will maintain a high efficiency over a wide range in load.

The runners in these turbines are of cast steel having a diameter of about 100″. The throat rings are also of cast steel and the throat ring for the adjustable blade turbine is machined to a spherical shape in order to permit movement of the adjustable blades and still maintain a constant clearance between the throat ring and the runner blades. The guide bearing in each of these units is of the rubber type, water lubricated. The bearing housing is lined with a series of metal strips to which the rubber is vulcanized. This type of bearing permits the bearing to be located immediately adjacent to the runner and is very much simpler in construction than the oil type bearing as the use of the rubber type bearing eliminates the stuffing box between the bearing and the runner, and also eliminates the necessity of furnishing oil pumps, oil catcher and sump pumps which are usually required where oil bearings are used.

Fig. 26

Great Northern Paper Co. north twin development operating mechanism. (Baldwin Southwark Corp., I.P. Morris Div.).

Woodward governors are furnished in connection with these units.

Fig. 26 shows the shop assembly taken from above of the operating mechanism of one of these units. The offset type operating gear is used in which the links connect the operating ring and levers are in compression when closing the guide vanes. The breaking element to protect the operating gear is a sheer pin shown in the photograph between the lever and coupling below which is keyed to the guide vane shank. In case of failure of this shear pin, the link and lever effected continue to move freely with the rest of the mechanism, the guide vane and coupling effected being stationary.

These three units are now being erected. It is expected that this plant will go into operation the early part of this year.

S. Morgan Smith.

Within the last year the S. Morgan Smith Company has installed, or now has contracts for some thirty or more hydraulic turbines of various sizes and types.

An important contract recently received is for two Smith-Kaplan fully automatic adjustable blade turbines, for the Lockport Plant of the Sanitary District of Chicago. Each unit will develop 8500 h.p. at 164 R.P.M. under 37.5 feet head. The existing plant will be remodelled to receive the new units, the present open flumes being changed over to concrete scroll cases and concrete elbow draft tubes of modern design will be constructed.

The rapid yet sound progress made in hydraulic and mechanical design has made such improvements possible. In many cases, the water intake passages, the flume or casing and the discharge passages of the existing power house are restricted in various ways. This is true of most of the replacement jobs now on order. Many difficult but interesting problems are presented to obtain the best possible results from the hydraulic, mechanical and economic standpoints.

D. Research and Laboratory Work.

Baldwin Southwalk Corporation, I. P. Morris Division.

During the past year we have carried on an extensive research program in our laboratory on both the Francis type and propeller type turbines, with the idea of obtaining a higher specific speed and better shaped efficiency curves. Considerable research work has also been carried on in the development of improved types of casings and draft tubes.

For all important contracts secured, complete model units are constructed in advance of the final design of the large units, and these models are thoroughly tested in the hydraulic laboratory in order to be able to predict the performance of the units at various loads and under varying heads.

Newport News Shipbuilding and Dry Dock Company.

Our new hydraulic laboratory, completed in 1933, has been operated continuously during the year with turbine and pump model testing. Facilities are provided for cavitation testing of turbines under suction heads up to about 22 feet.

S. Morgan Smith Company.

A large amount of test and research work was conducted in the hydraulic laboratory during 1934.

For the Sanitary District of Chicago, Lockport Power Plant, thorough tests were run for the purpose of determining the guaranteed results. An exact model was made of the full size runner, its gate case, scroll case, flume, intake, and draft tube. By testing the complete model, the horsepower and efficiency of the full size turbines in their permanent field setting was determined. Complete information was obtained to operate the turbines most efficiently over the entire range of head from 28 to 44 feet. The best blade and gate relationship under all heads was ascertained, so that the control mechanism could be properly designed.

The runner blades were carefully set and locked in a series of six positions or angles, covering the full stroke. At each position a series of tests were made with a sufficient number of gate openings, and with a sufficient range in speed, so that curves can be drawn to determine the exact opening to produce maximum efficiency at the particular blade angle under test, and for all the heads under which the large size turbines will operate. The data secured are thus much more comprehensive than is practicable in a field test.

The power was measured by an Alden absorption dynamometer and precision beam scale, the head by differential float gauges, and the water by a weir.

A series of tests were made on axial flow pumps. The object was to determine the characteristics of this type of pump with adjustable blades, and to secure design data.

Two and four blade pumps were investigated to determine the discharge, horsepower, and efficiency at wide range to speeds. Axial-flow and several types of elbow discharge tubes were used. The effect of the number and location of the guide vanes was thoroughly studied. Various shapes of intakes were tested.

Thorough tests were made on a pressure regulator (relief valve – synchronous bypass). This work was done preparatory to the design and manufacture of four regulators for the 115,000 h.p. turbines for the Boulder Dam Project.

The object of the tests was the determination of the size and design to secure proper discharge values at all openings and under all conditions of operation, to secure the best and smoothest absorption of energy, and to check the hydraulic control of the main piston under all heads and discharges.

An exact model was made of the full size valve, including the entrance and discharge passages. Two different designs of discharge tubes were tested. The energy absorber was thoroughly investigated as to shape and areas of passageways, location of disc, etc. For better observation, some runs were made with the discharge tube removed. Careful measurements of pressure above and below the main piston were taken; where desirable, continuous data being recorded on pressure-time charts. Reactions due to the discharge were determined. The forces required to balance the main piston and to raise and lower it with various time elements were carefully studied. The effects of variable head and variable back pressure were thoroughly investigated.

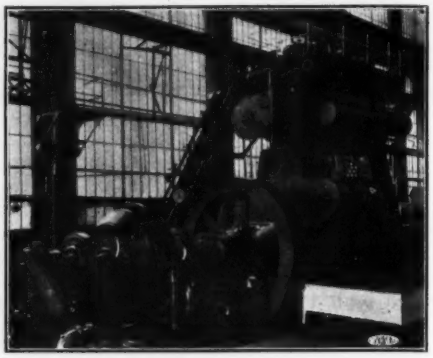


FIG. 27

Diesel engine having capacity of 750 hp. per cylinder. (Bush-Sulzer Bros.—Diesel Engine Co.).

V Oil Engines

Busch-Sulzer Bros.—Diesel Engine Company.

In spite of its outstanding efficiency in converting liquid fuel into power and utilizable heat, the Diesel oil engine has received little consideration from the pulp and paper industry. Probably this is due to the substantial requirements of steam and hot water for processes in these industries, and the lack of information among them concerning the possibilities offered by the Diesel engine to attain as high as 75 per cent overall thermal efficiency in the development of power and the supply of steam and hot water.

The fact that this type of engine is at all times ready immediately to take on peak overloads, or immediately to assume the plant load, in case of inadequacy or failure of steam or water power, should commend it to a fuller investigation by these industries.

This company, manufacturing chiefly moderate speed, rugged Diesel engines of the higher powers, has developed and operated in its shops, during 1934, an engine having a capacity of 750 h.p. per cylinder. A picture of the demonstration engine, having three cylinders, is shown in Fig. 27.

This engine will be built in multiple units, for generating electric current or driving machinery. Its prominent characteristics are extreme simplicity, and accessibility, combined with ruggedness and high efficiency. It will develop a brake horsepower hour with less than 4/10 pounds of fuel oil,—or almost 20 h.p. hours per gallon,—and, without additional fuel, will at the same time provide heat to furnish six gallons per brake horsepower hour of hot water, at 150 deg. F., from a supply at 100 deg F., plus three gallons per brake horsepower hour at 180 deg. F. from a supply at 150 deg. F.

Foster Wheeler Corporation.

One of the chief shortcomings of internal combustion engines, as compared with power generation by steam, is the inability of the engine to provide a satisfactory source of heat for buildings and process work. During the last few years, it has been found that instead of employing direct fired boilers to make up for this deficiency, it is possible to use waste heat boilers, specially constructed for recovering heat from exhaust gases at low temperatures. Such boilers have been highly successful in marine and stationary plants of horsepowers from 1000 to 5000 and as a result successful boilers built on the same principle have been put into service with horsepowers down to 90.

The recovery of heat at low temperature has been accomplished without excessive draft loss by employing heat absorbing elements constructed of steel tubing upon which

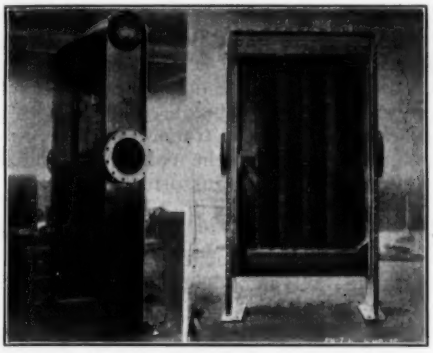


FIG. 28

Muffler type waste heat boiler. (Foster Wheeler Corp.).

are shrunk cast iron gilled rings. This combines several advantages—

1. The flow of gases is split up into small streams passing in intimate contact with the heat absorbing surface.
2. The change of velocity and direction of gases in passing through the boiler acts as an excellent muffler.
3. The cast iron rings are much more resistant to corrosion than steel tubing and very long life is provided by this construction, even with fuels containing a relatively high percentage of sulphur.

Fig. 28 shows a standard type of muffler type waste heat boiler for horsepowers up to 600. Tubes are vertical and gases make a single pass straight through the boiler. Access to all tube connections is provided by hand hole plugs.

McIntosh & Seymour Corporation.

We have arranged to bring all sizes of our engines to the same standard that we have adopted for the engines we have built for our locomotives. That is, that all our line of engines are now being built with mechanical injection of the fuel, forced lubrication complete even including the valve gear totally enclosed.

This saves operating labor, saves lubricating oil, increases the reliability and reduces the maintenance.

The general tendency in the design of the modern Diesel engines is to increase their efficiency, simplify the maintenance, arrange them so that it will require less operating labor to look after them, increase the output for a given investment, and reduce the weight and space required for the given output.

For use in paper mills the Diesel engine should be seriously considered.

When we built steam engines, we did considerable business in paper mills. They used the exhaust steam from the engine in their driers. The first engines operated against a back pressure of about 5 lbs., and the last steam engines we built for paper mills exhausted against a back pressure of about 40 pounds, which is as far as you can go in this particular direction.

Modern driers in paper mills use high steam pressures which enables the mill to either increase the speed at which the paper passes through the rolls or decrease the number of rolls.

This use of higher pressure steam in the driers decreases the amount of "by product" power obtained from the steam so used and important consideration should be given to modern Diesel engines.

VI Generation of Electricity

A. GENERATORS AND EXCITERS.

General Electric Company.

An entirely new type of generator voltage regulator is now available, which is inherently simple, relatively inexpensive, easy to understand, free from operating and maintenance troubles, and provides smooth voltage. It is available in three sizes, designed to control the voltage of alternating current or direct current machines of small and medium sizes for practically all types of central station, industrial, and marine service. It may also be used as a speed regulator for direct current motors.

This direct acting regulator consists of a torque motor type of voltage sensitive element balanced against a spiral spring which directly operates a wide range quick acting rheostat of a new design. The rheostat is connected in the exciter (or direct current generator) shunt field circuit and any change in voltage is corrected by the direct action of the torque motor on the exciter (or direct current generator) field rheostat. The torque motor is a direct current device and is excited through a small copper-oxide rectifier for alternating current machines, or through a small resistor for direct current machines. The characteristics of the torque motor and spring are such that voltage is held constant for all conditions of load, temperature, and frequency. Anti-hunting action is provided by a spring connected air dash pot.

The regulator parts are normally stationary, with no vibrating contacts, or intermediate relays, and the direct action gives quick response to voltage changes.

The rheostat element, mounted above the torque motor, consists of stacks of resistance material including graphite or carbon plates, with interleaved metal spacers and silver inserts, so arranged that the resistance of the stacks changes from almost zero to a maximum by a slight tilting of these stacks.

There are no noticeable steps in the resistance change, a smooth transition being obtained from maximum to minimum resistance. This permits accurate adjustment, by the regulator, of field currents to exactly the right value. The rheostat element is of compact design, having a relatively high rating for its size, and a voltage adjusting rheostat is built into the regulator.

The regulator, being self-contained in one small unit, may be easily mounted in any convenient location, and requires only four small leads.

VII. Distribution of Electricity

A. SWITCHGEAR.

General Electric Company.

1934 has seen developments and improvements in all lines of switchgear, oil circuit breakers, Air circuit breakers, circuit reclosers, horn-gap switches, and relays all were improved. Space is not available for describing the developments and the reader is referred to John Liston's review of the electrical field for 1934 which appeared in the General Electric Review, Jan. 1935.

Westinghouse Electric and Manufacturing Company.

The year 1934 has witnessed the development of oil circuit breakers and other circuit interrupting devices of higher capacities, higher voltages, and at greater speed. Relays have been further developed to higher speeds, so that the overall protection problem is being taken care of in a much shorter time than was previously possible. Switchgear in general, with the exception of the higher voltage classes, have been developed or are being developed in metal enclosed form in all sizes and capacities.

In the field of larger circuit interrupting devices the year 1934 has seen an increasing use of arc control devices such as the Westinghouse type De-ion grid. Circuit breakers using De-ion grids are now available in sizes from 100,000 kv.a. rupturing capacity up to and including the

maximum breaker capacities and service voltages. This makes the advantages of this type of arc extinguishing device available for practically all requirements.

The Westinghouse Nofuse De-ion circuit breakers have continued in the forefront of distribution development. These circuit breakers are available in capacities up to 600 amperes at 600 volts a. c., with rupturing capacities as high as 20,000 amperes. This figure probably represents the highest concentration of circuit interrupting capacity per unit volume so far obtained. In addition to the manual form in which these breakers were first introduced they are now available in electrically operated form, which makes them adaptable to remote control as well as some forms of automatic control. Other features, such as auxiliary switches, special forms of tripping, etc., have been added which makes this type of circuit breaker available for many applications that were not contemplated when the design was originated.

Metal enclosed switchgear is now available in capacities from 15 amperes, 125 volts, with 5000 amperes rupturing capacity up to 4000 Kv-A., 23,000 volts, with 2,500,000 kv-a. rupturing capacity. The continued growth in metal enclosed switchgear applications indicates further recognition of the numerous advantages of this type of equipment including safety, compactness, low installed cost, reduced time for erection, and complete overall unified responsibility. All modern switchgear is now definitely of the metal enclosed form.

B. Overhead, Underground and Interior Distribution.

Westinghouse Electric and Manufacturing Company.

In protective relaying much progress has been made in the development of improved forms of conventional protective relays and high speed relays. With fault duration and stability problems becoming more serious matters, it has become more desirable and in some cases actually urgent to reduce the operating time of the protective relay to an absolute minimum. These fast acting relays are now used to isolate faulty apparatus as well as faulty sections of transmission line, and in the latter case they are frequently used in conjunction with carrier current systems to effect the simultaneous opening of the circuit breaker at the end of a faulty section of line.

C. Transformers, Converters, etc.

General Electric Company.

A complete line of lightning protective equipment was designed to meet the important and exacting protective requirements of rotating machines. The line covers practically all machines, all kv-a. sizes, and all voltage ratings, and consists essentially of a modified form of the standard station type Thyrite arrester and a protective capacitor of the Pyranol type.

For machines connected directly to overhead lines, the equipment consists of capacitors at the machine terminals and pellet arresters approximately 2000 feet from the station on each outgoing line. The purpose of the pellet arresters is to reduce the energy of incoming surges so that the capacitors at the machine terminals can be of a reasonable size. The capacitors alter the entering surge, resulting in a practically uniform transient-voltage distribution throughout the machine windings.

Rotating machines having transformers between them and overhead exposed lines also require protection, as surges from the transmission line may be transmitted electrostatically or electromagnetically through the power transformer to the rotating machine.

In this case, special station type arresters and capacitors are provided on the machine side of the transformer. The effectiveness is enhanced if the usual lightning arresters are also used for the protection of the high-voltage side of the power transformer, because the voltages appearing on the machine side of the transformer are directly proportional in magnitude to the voltages permitted on the high voltage side of the transformer.

Westinghouse Electric and Manufacturing Company.

A new line of power capacitors has been developed and placed on the market, embodying many new improvements in design which are the results of years of research work that has been carried on to improve this product. These units are impregnated with the new Westinghouse fireproof impregnating medium inerteen, they are enclosed in welded cases of .05 sheet metal, and equipped with rugged solder seal porcelain terminals. It is truly a hermetically sealed capacitor unit. These units are 43 per cent smaller and 33 per cent lighter than previous design of oil units.

These welded, compact units are assembled in new design of welded housing or frames, or in cabinets, and each unit is equipped with a new design of boric acid fuse which is capable of effectively clearing the circuit in case of a fault, positively confining the trouble to the fault, and leaving the rest of the equipment in service, thus avoiding an interruption in the revenue derived from the use of the capacitor.

VIII. Plan and Design of Power Plant and Distribution Systems

Westinghouse Electric and Manufacturing Company.

The American Boxboard Company of Grand Rapids, Mich. has recently completed the electrification of their No. 1 mill. The power for this mill was previously generated by four small steam turbines having a total capacity of 2050 kw. with a plant load of 1700 kw. Three steam engines were used for driving the paper machines, jordans and beaters.

This company made a study of the problem of electrifying this mill based on complete records from another of their mills, previously electrified, of the number of kilowatt hours generated for each of its operations and also the total number of pounds of steam used for heating buildings and drying paper. This analysis brought out very clearly that by replacing the four small turbines with one larger turbine and replacing the steam engines with electric motors savings would be made in the annual steam consumption which would pay for the complete modernization of this mill in approximately three years. They also found that a plant power factor of better than 80 per cent could be obtained by using high speed squirrel cage induction motors and speed reducing gear units for driving the jordans and beaters. This is a better power factor and a more economical installation than could have been obtained by using low speed induction motors directly coupled to the machines.

The equipment for this electrification was supplied by the Westinghouse Electric & Mfg. Company and consists of the following:

One 3000 Kw. condensing bleeder type turbine generator unit, one 1950 square feet condenser, single motor paper machine drive equipment, four 100 h.p., 1725 r.p.m. squirrel cage induction motors and four gear reduction units 1725 to 435 r.p.m. for driving jordans and five 60 h.p., 1160 to 235 r.p.m. squirrel cage induction gearmotors for driving beaters.

Possibilities of Improving Pulping Characteristics of Pulpwoods by Controlled Hybridization of Forest Trees*

Ernst J. Schreiner[1]

Abstract

The improvement of forest trees by breeding or by pure line or mass selection can be expected to prove profitable not only to the wood producer but also to the industry which utilizes the wood. Breeding and selection, directed toward the best correlation of what may conveniently be termed the "forest requirements" of the producer and the use requirements of the industry, is practically an unexplored field and the first strides in this direction may therefore be expected to result in valuable developments.

The new hybrid poplars produced by the breeding project of the Oxford Paper Company are decidedly more valuable than the native poplars: They grow more rapidly, are more easily propagated and in numerous cases are more resistant to diseases. On the basis of investigations on young tree, many of the hybrids can be expected to produce wood with a longer average fiber length and somewhat higher density than the wood of the native poplar (aspen) commonly used in Maine for soda pulp. It is certain that the best of these new hybrids are desirable and valuable for any forestation plantings in which poplars are to be employed.

The results obtained in the poplar breeding project fully support the view that hybridization and selective breeding of forest trees will give results comparable to those realized in the development of the older crop plants.

The chief source of the fibrous raw materials used in the production of pulp and paper are forest trees. Practically all of this raw material is obtained from forest stands which have developed naturally without artificial aid of any kind. There is still a great quantity of wood in our natural forests, especially in the South and West, and to a greater extent than is often appreciated, even in New England. The question which is of most importance to the individual pulp and paper company is the species composition of the natural forest and the proximity of this natural wood to its own mill.

In general two courses are open for the utilization of existing forest stands by an established mill: those species which are suited to the manufacturing process can be used, or the manufacturing process can be changed to suit the species which are most abundant and available at reasonable cost. In the early years of the industry the first procedure was the general rule. Due to the abundance of wood it was possible to use only those species, and even those sizes of trees, which were most desirable for production purposes. In late years the rapid disappearance of the most desirable species has made it necessary to use increasingly larger quantities of the wood of species which were formerly considered less desirable. Balsam fir is probably a typical example of such a species. More recently manufacturing processes have been changed and new processes are now being devised to utilize species which could not be used previously. The work now under way on southern pine is an example of this change in utilization.

Numerous paper companies have adopted more or less empirical systems of forest management to insure a future supply of suitable timber within easy reach of their own mills. In many cases natural reforestation can be assured by relatively simple and comparatively inexpensive methods, such as protection of young growth during the logging operation, adequate provision for seed trees on the cut-over area, girdling of weed trees and protection against fire and live stock. With such forest improvement methods the forester is limited to the species which occur on the area as seed trees or as advance reproduction.

Artificial reforestation by planting or seeding is being carried on by many paper companies to restock areas where natural regeneration is uncertain, or where the natural reproduction consists predominantly of undesirable species. Such reforestation permits of a wide choice of growing stock, but native species and varieties have usually been used for forest planting and only a few desirable species have been introduced from other countries. Although some emphasis is placed on the selection of seed from individual trees of outstanding quality, and considerable effort is made to collect seed for use in a particular region from an approximately similar environment, few attempts have been made to apply systematic breeding and selection methods to the improvement of forest trees.

The possibilities of improvement by controlled breeding and selection have long been generally recognized in all phases of agriculture and animal husbandry. The application of such methods for the improvement of forest trees was stressed by Henry as early as 1910 (*2*). Within the

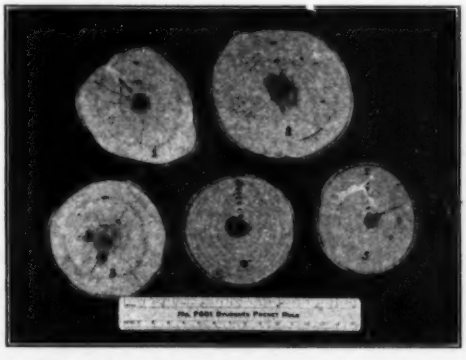


PLATE 1.—Comparison of diameter growth made by three of the new hybrids with that made by the native aspen. Cross sections of stems of trees grown under comparable conditions (site, soil, density of stand). Sections cut 10 inches above the ground. No. 1—New hybrid poplar. Average diameter 3.1 inches. Age 3 years. No. 2—New hybrid poplar. Average diameter 3.6 inches. Age 4 years. No. 3—New hybrid poplar. Average diameter 3.0 inches. Age 3 years. No. 4—Native aspen (*P. tremuloides*). Average diameter 2.9 inches. Age 9 years. No. 5—Native aspen (*P. tremuloides*). Average diameter 2.8 inches. Age 9 years.

*Presented at the annual meeting of the Technical Association of the Pulp and Paper Industry, New York, N. Y., Feb. 18 to 21, 1935.

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last twenty years forest tree breeding has been discussed to some extent in widely scattered publications, but relatively little actual breeding work has been undertaken and from a practical standpoint this is still a virgin field.

Unfortunately the improvement of forest trees has always appeared to be a long-time proposition, and in cases where the fixation of hybrid characteristics can only be obtained through repeated seed selection this is especially true. A short cut to this ultimate end is possible through the vegetative propagation of desirable hybrids in groups of trees which can be reproduced from cuttings, root suckers, etc. For example, one individual poplar or willow tree can eventually be multiplied into innumerable trees by annually cutting up the young stems into ten-inch lengths and planting these pieces in the ground. All the trees which are derived from one individual in this manner are members of a "clone," and except for the relatively infrequent somatic mutations they all have the identical hereditary make-up and the same qualities as the original tree. Any desirable characteristic of a hybrid poplar can therefore be maintained by means of vegetative propagation.

Many of our most important forest trees cannot be economically propagated by vegetative means. Propagation by grafting is possible but at the present time it is too expensive for forest planting stock. The possibility of developing a satisfactory method for the vegetative propagation of tree species which are ordinarily propagated only by seed should be considered. Where means of vegetative propagation are lacking improvement of forest planting stock is possible by utilizing the frequent uniformity and "hybrid vigor" of first generation hybrids (i. e. by always growing hybrid seed) or by selection of natural races or strains of native species. Pure line selection would be highly desirable but mass selection will be more practical with most forest species.

The improvement of trees may be considered from the viewpoint of the producer (in this case the forester) who needs a tree which will yield the highest return in the shortest period of time, and from the viewpoint of the consumer (in this case the mill man) who is looking for a tree which will supply the fibrous raw material best suited to the production of a particular product. (In most cases a paper company is both producer and consumer but for the purposes of clarity this distinction will be used in the discussion.) The requirements of the producer and consumer are not always identical and the breeder must recognize, breed for, and select those individuals which combine to the best advantage the qualities desired by both producer and consumer. For example, in the breeding of trees for pulpwood the forester desires a fast growing tree because a short cutting cycle results in a higher return on the investment. The mill man is interested in a tree with wood of high density because of the direct correlation between the density of the wood and the yield of pulp per cord. In some instances these two qualities will be negatively correlated (i. e. fast growth will produce light wood and slow

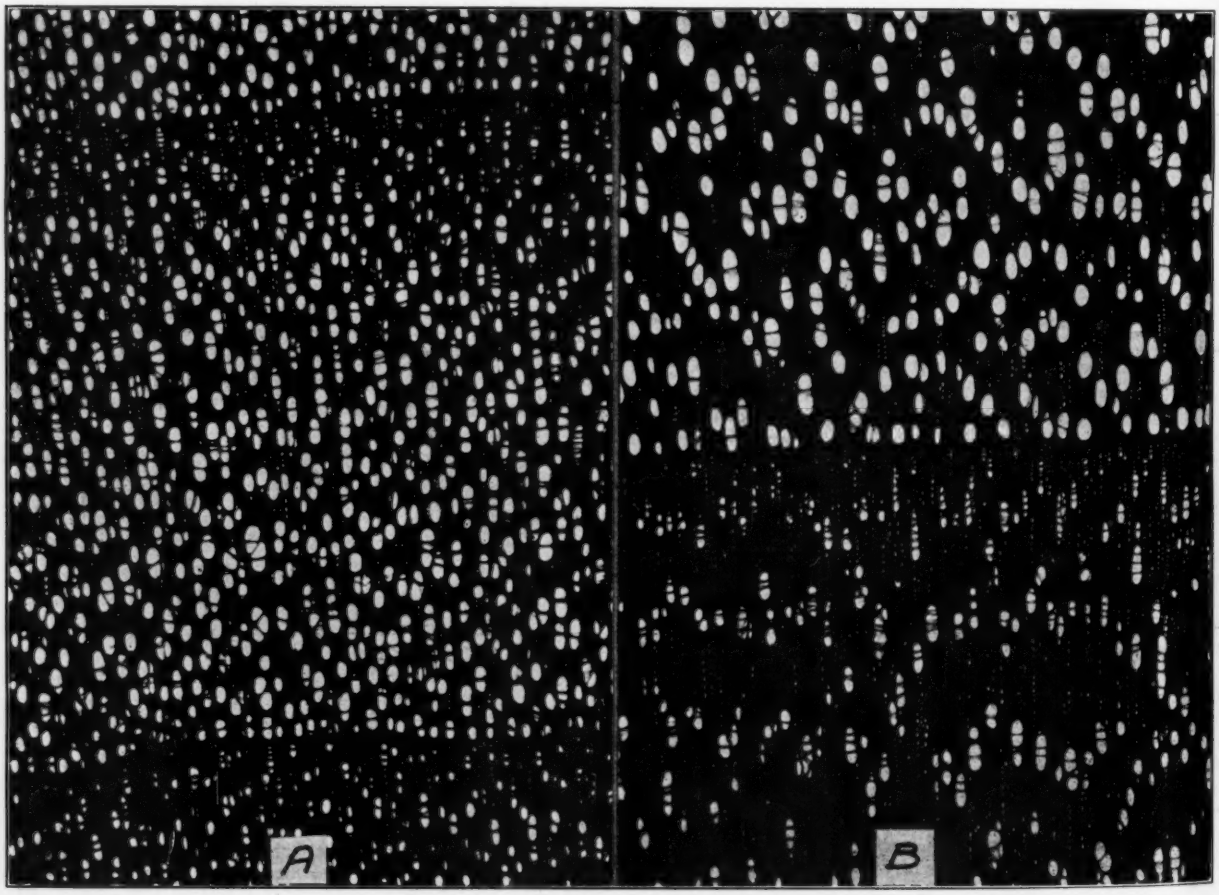

PLATE 2.—Cross section of the wood of the native aspen and of one of the new hybrid poplars. In both photographs the dark horizontal lines are annual rings and the wood immediately above each ring is springwood. Mag. ×41. A. Wood of native aspen. Average diameter growth 0.31 inches per year. B. Wood of a new hybrid. Average diameter growth 0.9 inches per year.

growth will produce heavy wood) and the tree breeder must then select individuals which combine these two qualities to the best advantage.

Improvement of Forest Trees from the Viewpoint of the Forester

The characteristics or qualities which the forester is primarily interested in developing through breeding and selection of forest trees may be quite clearly defined. In general most importance will be placed upon hardiness in the region where the trees are to be grown, rapidity of growth, low susceptibility to disease and insects, and low cost of propagation and planting. These characteristics are essential for profitable reforestation.

Improvement of Forest Trees from the Viewpoint of the Mill Man

The manufacturer of pulp and paper is primarily interested in the characteristics or qualities of the wood of forest trees. His most direct interest in tree breeding would be in the possibilities for improvements in the quality of the fibrous raw material (wood) which will be reflected in the quality or cost of his finished product. Each mill has its own particular requirements with regard to wood quality so that definite desirable characteristics can hardly be set down. Furthermore many qualities and properties of wood and their effect upon the finished product have not yet been adequately defined.

Physical Characteristics of the Wood and Fiber: Wood of high density, durability in storage, with a minimum of knots and in some conifers a minimum pitch content are qualities of the wood which are generally recognized as desirable. There is also considerable evidence that the penetration of cooking liquors into wood is related to the structure and arrangement of the cells in the wood as well as to the size, shape and moisture content of the chips.

PLATE 4.—A. The best tree in an eight-year-old plantation of the Norway Poplar. Height 26 feet, d.b.h. 2.9 inches (scale at d.b.h. is 6 inches long). B. The best tree in an eight-year-old plantation of the Eugenei Poplar. Height 30 feet, d.b.h. 4 inches.

PLATE 3.—Photograph taken in early September to illustrate variation among the new hybrids in resistance to rust disease. Trees without leaves at right are members of a clone (vegetative propagations from a single hybrid) which is highly susceptible to rust disease. Trees at left, in full leaf, are members of a hybrid clone which is much more resistant to this disease. Both of these hybrids have the same female parent but different male parents. The trees in the photograph are the same age; the vigor of the highly susceptible clone has been seriously affected by the disease.

Fiber length is related to certain properties of the finished paper such as strength, formation, surface and finish. The influence of other physical characteristics of the wood fibers upon the properties of the finished paper is not thoroughly understood. The fineness of the fiber, i. e. the realtive diameter per unit length, must be reflected in some characteristic of the sheet. It seems probable that fibers of different species vary structurally (possibly in the arrangement of their fibrillar constituents) but the effect of such differences upon the finished sheet is still a matter for speculation.

Chemical Characteristics of the Wood and Fibers: Aside from the physical differences between various woods there are variations in chemical composition which are certainly reflected in the manufacturing processes and in the finished product. The wood of different tree species varies in the percentage of cellulose, lignin and other chemical constituents. Furthermore there seems to be some variation either in the nature of the cellulose and lignin in different woods, or more likely in the quantity, composition or bonding of the materials closely associated with the cellulose and lignin. Possibly the percentage of lignin which is very intimately associated with the cellulose varies in different woods. The effect of these chemical characteristics of the raw material on the manufacturing process and on the finished product is generally admitted but not definitely understood. The yield available within the range of commercial bleachability and the maximum brightness attainable with any combination of commercial pulping and bleaching processes are apparently functions of the chemical composition of the fibrous raw materials. The permanence of the finished product may also be partially related to the chemical characteristics of the fibers.

Response of the pulp to beating and the color, strength, brittleness, softness, bulk, density, opacity, absorbency and surface of the paper, although very definitely influenced by the manufacturing processes, are in the last analysis apparently limited by inherent characteristics or qualities of the fibrous raw materials. These qualities or characteristics of the wood may be physical, structural or chemical in nature, or they may be combination effects.

Fundamental investigations will eventually clear up the

relationship between the properties of the finished product and the properties of the fibrous raw materials, but for the purposes of the tree breeder it is sufficient that these variations exist between the wood of different tree species, and to a much more limited extent between the wood of trees of the same species. Variation is the "stock in trade" of the breeder because it is through variation and well directed selection that valuable improvements are obtained.

In discussing variation within a species, it is necessary to note that the properties of trees of the same species often vary with latitude, altitude, site quality and other environmental conditions (*3, 4, 7*). In some species such variations may indicate geographic races and may actually be inherent characteristics. Environmental conditions do have a marked effect on the characteristics and qualities of many plants. Complete control of these variations are beyond the limits of breeding work but such developmental variations should be considered in local plantings. It is necessary to choose the proper site for each new tree type, but the requirements probably fall within broad limits in any one locality and should not be difficult to recognize.

Popular Breeding Project of the Oxford Paper Company

In 1924 the Oxford Paper Company in cooperation with The New York Botanical Garden started a project for the improvement of poplars by hybridization. This work was carried out under the direct supervision of Dr. A. B. Stout of The New York Botanical Garden. Since that time the Eddy Tree Breeding Institute has been established in California for the improvement of conifers. Hartley (*1*) has discussed forest genetics with particular reference to disease resistance. Koehler and Paul of the Forest Products Laboratory have called attention to the relation of genetical factors to the quality of wood produced in forest trees but state that nothing elaborate along this line is being attempted beyond "experiments on grafting scions or buds of figured walnut, maple, etc., on normal root stocks to see if trees with figured wood can be produced in that way. . . ." (*3*).

PLATE 5.—One of the new hybrids in a seven-year-old plantation. This tree has grown to a diameter of 6½ inches at breast height (4½ feet above the ground) and a total height of about 32 feet.

PLATE 6.—Photograph taken in an eight-year-old plantation of the new hybrid poplars. Each of the trees in this photograph are from seedlings of hybrid origin and show much variation. There is a very noticeable difference in habit of growth between the much branched hybrids in the foreground and the comparatively clean individual in the center of the photograph (at stake).

The improvement of forest trees has also received considerable attention in Europe. An experiment station for the study and the culture of poplars has been established in Italy. Dr. v. Wettstein has hybridized a number of poplars in Germany and has published a report of his work and brief descriptions of the young hybrids (*11*). A project for the selection and establishment of pure lines has been initiated by Nicolai in Danzig and this work is apparently well under way (*5, 6*).

Poplar was chosen for the breeding work undertaken by the Oxford Paper Company because of its importance as a raw material for the production of soda pulp and because of the ability of poplars to reproduce vegetatively from cuttings. Mature trees of many species, varieties and hybrids of this group were available for the work of breeding at The New York Botanical Garden and at Highland Park, Rochester, N. Y., and trees of the native Necklace Poplar (*P. balsamifera* var. *virginiana*) were available on the grounds of The New York State Experiment Station at Geneva, N. Y.

The Poplar Breeding Project from the Viewpoint of the Forester

The breeding project has been highly successful and the general results have been reported in several publications (*8, 9, 10*). A total of over 13,000 new hybrids have been produced from about 100 different cross-combinations between different types of poplars. At the present time 69 individual hybrids have been selected for use in reforestation. Many of these appear to be much better than existing species, varieties or hybrids in rapidity of growth, resistance to disease, low cost of propagation, hardiness, and habit of growth. The remaining hybrids are growing in forest plantations and are now 6 and 7 years old. It will soon be possible to cut some of these trees and to select for desirable properties from the standpoint of pulp and paper production.

From the viewpoint of the forester the breeding project has resulted in the creation of numerous poplar hybrids which appear to be very promising for reforestation planting. Some of the best hybrids growing in forest plantations in Oxford County, Maine, have reached a diameter of 6 to 7.5 inches at breast height (4½ feet above the ground) and a total height of 30 to 35 feet in 8 years. The best of the previously existing poplar hybrids growing in comparable forest plantations of the same age are only 3 to 4 inches in diameter and 20 to 25 feet in height. Many of the new hybrids have so far been highly immune to various poplar diseases and all of the selected hybrids have been entirely hardy under climatic conditions in Maine, in spite of the fact that one or the other of the parents of some of these hybrids are highly susceptible to frost injury. All of the selected hybrids root very readily from cuttings and in some instances the rooting ability of the hybrids is far better than that of the parent stock. The selection studies have now reached the point where it is possible to indicate the most likely hybrids for economically successful reforestation.

The Poplar Breeding Project From the Viewpoint of the Mill Man

Selection from the standpoint of the mill man, for the improvement of pulping qualities, must be based upon studies of the wood, and the lack of fundamental data on the correlation between wood properties and pulp properties eliminates any method other than pulping trials for the detection of such improvements. Pulping tests on a laboratory scale will soon be possible on many of the hybrids in the older plantations. Up to the present time

PLATE 7.—View in an eight-year-old plantation of the new hybrid poplars. Each one of these represents an individual seedling of hybrid origin. There is much variation among these individuals.

PLATE 8.—The hybrid poplars in this photograph are all sister seedlings: they all have the same parentage. Such groups of sister seedlings often show considerable variation among themselves.

fiber length and density are the only properties of the wood which have been investigated.

Fiber length in poplar (as in all tree species which have been investigated) increases with age up to a miximum, which is rather well defined for each species, and then remains fairly constant. The average fiber length in one-year-old wood should therefore be indicative of the probable average fiber length in the mature tree. The average fiber length in one-year-old wood of several of the new hybrids is between 0.8 and 0.85 mm.[2], compared to an average length of 0.53—0.57 mm. in one-year-old wood of the trembling aspen (*Populus tremuloides*) which is extensively used for the production of soda pulp. These hybrids should therefore supply wood with longer fiber than is available in the wood of the native aspen.

Preliminary studies indicate that the wood of the new, faster growing hybrids is somewhat denser than aspen wood grown in western Maine. Microscopic examination of the wood indicates that this may be due primarily to the proportionately larger vessel volume (i.e. greater percentage of air spaces per unit volume) in the wood of the slower growing aspen. Paul (*7*) reports similar correlations between density and vessel volume in the wood of fast growing and slow growing trees of other diffuse porous, hardwood species. Other factors, such as average fiber diameter, thickness of the fiber wall, percentage of ray or parenchyma tissue per unit volume of wood, may also contribute to the differences in the wood density of the poplars under discussion.

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[2]The trembling aspen was not used in these hybridizations and whether or not these figures represent an increase over the fiber length of the parents of the particular hybrids under discussion has not been determined.

A Study of the Factors Influencing the Brightness of Paper as Recorded by the General Electric Reflection Meter*

By Edwin R. Laughlin[1] and Otto Kress[2]

Abstract

A study has been made in an effort to determine which of the variables encountered in the manufacture of paper exercise the greatest influence in the control of brightness. The indications are that fluctuations in freeness of the stock due to its mechanical treatment as well as normal variations in size and in the turbidity of the water employed are relatively uninfluential, and that while these variables do exercise a certain influence, the effect produced upon the brightness uniformity of the resulting sheet is, within the normal limits of variation, very slight. Furthermore, three cooperative mill studies indicate that the paper machine itself presents no difficulties since it produces paper of a degree of brightness in accord with that of the stock fed to it, and that variations across the width of the machine, and variations produced by such operations as tub sizing and calendering are practically negligible. The matter of control of brightness is dependent upon the uniformity of the raw materials and upon the constancy with which the filler content (if any is used) is maintained. These variables present little difficulty to mills equipped with average technical control.

In addition, the influence of dyestuffs upon brightness has been extensively investigated, and the indications are that it is entirely possible for mills to aid brightness maintenance within the desired grading limits by the proper applications of dyestuffs, provided that the other paper making variables are controlled with reasonable uniformity.

Since the advent of grading and the classification of various types of paper into groups of definite brightness specifications, the question has frequently arisen as to how closely it is possible for a mill to control brightness, and what factors are most influential in causing brightness variations. The answer to this question involves a study of all the common paper making variables from the stock to the finished paper such as the effects of all ingredients making up the finished sheet, the changes produced by mechanical action in preparation of the stock, and the degree of uniformity with which the paper machine itself can and does operate.

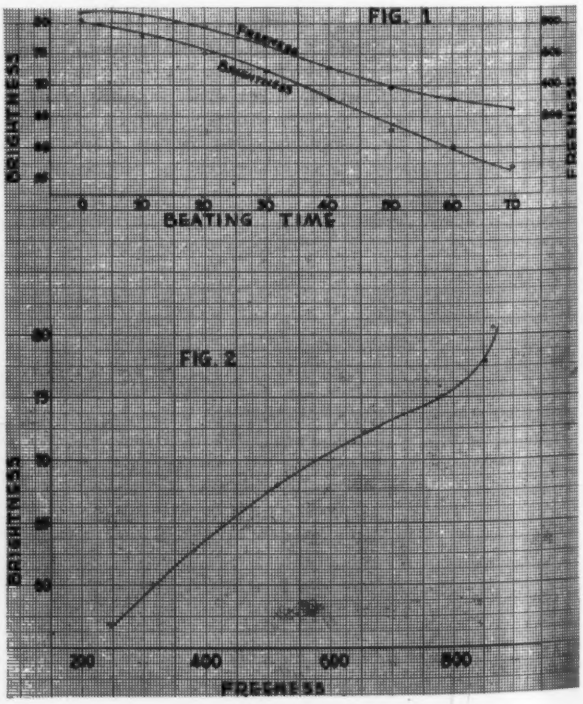
It is the purpose of this work to undertake such a study and, in throwing more light upon the little known subject of brightness, to determine from actual mill runs the normal limits of fluctuation, the reasons for abnormal fluctuations, and to present evidence whether, and if so, how brightness may be controlled feasibly within the present grading limits.

There are certain phases of paper making which, because of the ease of varying them within wide limits, can be studied to much better advantage in the laboratory than in the paper mill. For this reason, a few preliminary studies were conducted in which were followed such effects as hydration, varying amounts of size and alum, clay, turbidity of water, and mixtures of stocks of differing brightness. In these preliminary studies it was not intended to institute exhaustive research, but merely to conduct a few simple tests which could be taken as a measure of the degree of importance of the variables just mentioned and thus obtain leads as to where to look for trouble, if any existed, when the mill runs were followed.

The Effect of Hydration

Bleached Mitscherlich sulphite was beaten at 1.9 per cent consistency in a one pound Valley beater with 10 pounds on the roll, and samples for hand sheets taken at 10 minute intervals throughout a 70 minute beating period. The degree of hydration was followed with the Schopper-Riegler freeness tester, and hand sheets formed[3] on which brightness was determined with the General Electric Reflection Meter.[4] Table I contains the data from which Figs. 1 and 2 were plotted. These indicate that

[3] See Appendix (1) for procedure in making hand sheets.
[4] See Appendix (2) for procedure in taking brightness readings on hand sheets.



* Presented at the annual meeting of the Technical Association of the Pulp and Paper Industry, New York, N. Y., Feb. 18 to 21, 1935.

[1] Member TAPPI, Color Technician, E. I. du Pont de Nemours & Company, Inc., Wilmington, Del.

[2] Member TAPPI, Technical Director, The Institute of Paper Chemistry, Appleton, Wis.

brightness falls off rapidly with decreasing freeness, as would be expected. However, it is significant that within the freeness variation normally experienced in the manufacture of a particular paper (15 to 30 points), the brightness change due solely to change in freeness is negligible.

In connection with one of the mill studies made, the over-all freeness variation of the stock from beater to beater was found to be 31 points throughout a 30 hour run, and the stock before going on to the paper machine varied 30 points. This degree of variation produces so slight a change in brightness that its effect may be considered negligible since the brightness changes resulting are within the limits of experimental error in taking brightness readings.

The factor of hydration as produced by mechanical treatment of the stock may thus be considered relatively uninfluential with regard to control of brightness, unless abnormal freeness fluctuations result through careless operation.

TABLE I

Beating Time (Minutes)	Average Freeness	Average Brightness
0	867.5	80.58
10	855.	77.84
20	780.	75.06
30	655.	72.43
40	515.	68.01
50	382.5	62.78
60	315.	60.16
70	245.	56.93

The Effect of Size and Alum

Hand sheets were formed from bleached sulphite, engine sized with rosin size in varying amounts up to 4 per cent, sufficient alum being used in each case to precipitate the size and render a pH of 4.5 to 5.0 when the stock was diluted to 0.5 per cent consistency with neutral water. The data are contained in Table II, and Fig. 3 illustrates that a variation in rosin size between 1 and 4 per cent has practically no effect upon the brightness of the paper resulting, all other things being constant. As this degree of variation is far beyond the normal size fluctuations experienced during the manufacture of a specific paper, the factor of size may be regarded as uninfluential.

It is interesting to note that the difference in brightness between a sized and unsized sheet of the same stock is approximately two points. This value was obtained upon several different occasions. In one instance a bleached sulphite showed a brightness of 78.24 when unsized, and when sized with 2 per cent rosin size and 2.5 per cent alum gave a brightness of 76.19 or a decrease of 2.05 points. In another instance the brightness of a hardwood sulphite dropped from 88.4 to 86.2, or 2.2 points when sized in the same manner.

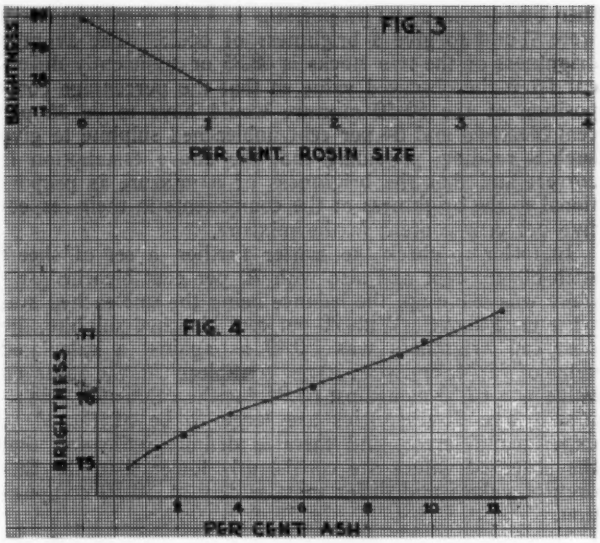
The factor of sizing may thus be dismissed with the statement that variations in rosin sizing from zero to one per cent produce a drop in brightness up to two points, and that in the range of 1 to 4 per cent fluctuations may be considered inconsequential as far as brightness is concerned.

TABLE II

Per Cent Size	Per Cent Alum	Average Brightness
0.0	0.0	79.91
0.5	1.0	78.90
1.0	1.5	77.71
1.5	2.0	77.65
2.0	2.5	78.20
3.0	3.0	77.70
4.0	3.5	77.61

The Effect of Clay

Varying amounts of a commercial grade of clay (brightness of 82) were added to a 50-50 soda-sulphite stock mixture, 2 per cent rosin size and 3 per cent alum added,



and hand sheets formed. Brightness readings were recorded and the sheets ashed for actual filler content. The data are shown in Table III and plotted in Fig. 4. Inasmuch as the retention of fillers or pigments in laboratory hand sheets is generally much less than in mill-made sheets and since frequently the two-sided effect is not comparable with that of commercial sheets, the average brightness of the felt and wire sides was used in plotting the curve.

These results are of significance only in that brightness is increased as actual filler in the paper is increased, provided that the filler used is brighter than the stock. Had this work been done with a duller stock, the effect of the filler would have been much more marked. This statement is made because of the results obtained in connection with the mill studies, and the matter was not given further laboratory trial because more significant data will be presented in discussing these studies. It may be stated here, however, that the filler content is a particularly influential factor and that it must be closely controlled if uniform brightness is to be maintained, especially in those cases where there is a marked difference in the brightness of the filler and the stock, as for example, the use of a clay with a brightness near 85 in a stock with a brightness of from 60 to 70.

TABLE III

Per Cent Clay Added	Per Cent Ash	Average Brightness		
		Felt Side	Wire Side	Average Wire and Felt
0.0	.43	74.33	75.52	74.93
2.5	1.32	74.71	75.76	75.24
5.0	2.16	74.86	75.92	75.39
10.0	3.67	75.06	76.51	75.77
20.0	6.24	75.83	76.57	76.20
30.0	9.04	76.20	77.38	76.79
40.0	9.74	76.18	77.67	76.93
60.0	12.23	76.68	78.13	77.41

The Effect of Stock Mixtures

The purpose of this part of the work was to determine the effect upon brightness of blending in known amounts of stocks of known brightness. One might readily assume that a 50-50 mixture of a stock with a brightness of 80 and a stock with a brightness of 60 would result in a sheet with a brightness of 70.

To establish or disprove the validity of this assumption, the brightness of a bleached and unbleached sulphite was determined by making hand sheets, the average values being 78.59 and 59.10 respectively. These stocks were

then blended in equal proportions and the resulting sheets were found to give a brightness of 66.25. The average brightness of the two stocks is 68.85 or sufficiently different from the observed value so that the percentage composition of the 50-50 mixture would have to be 36 per cent bleached and 64 per cent unbleached sulphite to give such a reading, providing that the above assumption is correct and that the brightness of a mixture is proportional to the brightness of the components in their respective per cent content in the mixture.

In order to check the matter further, a set of sheets with 30 per cent and also with 70 per cent bleached sulphite was made up, the balance being the unbleached sulphite used above. With 70 per cent bleached sulphite, the observed brightness was 70.49 as against a calculated value of 72.74: and with 30 per cent bleached, the observed value was 63.53 as against 64.94 for the calculated brightness. The discrepancies are large to be attributed to experimental error, and there is definite indication that the observed values are consistently lower than the theoretical values and differ most widely at 50-50 composition.

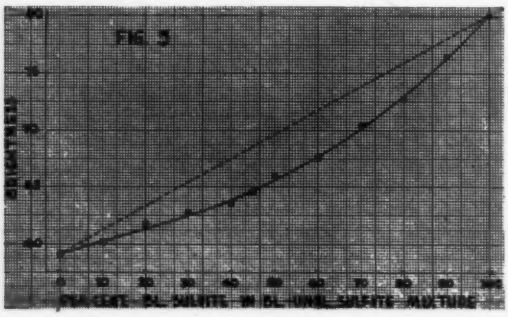
As a recheck, the experiment was repeated on a larger scale and special care taken to insure accurate proportioning in the mixtures. The pure stocks gave approximately the same brightness as before, the difference in the unbleached sulphite being attributed to changes in the preparation as it was necessary to beat more of the stock. Mixtures were then made varying each stock from 20 to 80 per cent, hand sheets were formed, and brightness readings recorded. Table IV contains the data, and it is again apparent that the calculated values are consistently higher.

TABLE IV.

Per Cent Bleached Sulphite	Per Cent Unbleached Sulphite	Observed Brightness	Calculated Brightness
100		78.01	
	100	57.90	
80	20	72.92	73.99
70	30	68.90	71.98
60	40	67.08	69.97
50	50	66.25	67.95
40	60	63.84	65.94
30	70	62.33	63.93
20	80	62.11	61.92

Again, the discrepancies are too great to be attributed to experimental error.

However, it was desired to present still further evidence before discounting the original assumption, and for this purpose another bleached sulphite stock was prepared together with more of the unbleached stock previously used. This time several sheets were made so that many readings could be averaged, and every possible precaution was taken to give accurately the percentage composition desired in the finished sheets. The mixtures were prepared on a sufficiently large scale so that errors in proportioning were minimized, and each mixture was thoroughly agitated under the same conditions before preparing the sheets. Table V contains the data, and again the characteristic differences are evident, this time to a slightly larger degree than previously. Fig. 5 shows graphically the observed brightness with varying composition, as well as the theoretical brightness if the original assumption is correct.



It is quite evident that there is a definite reason for this effect and for the type of curve obtained, and in an effort to offer a plausible explanation the following hypothesis was drafted: Cellulose fibers possess sufficient transparency to make it necessary, when taking brightness readings, to back up any sheet to be tested with several thicknesses cut from the same sheet in order that a true measure of the light reflected may be obtained. The unbleached fibers, because of their lower brightness, must reflect less and absorb more of the blue light directed upon them, and it is conceivable that a part of this effect is due to their low transparency as compared with the bleached fibers, for the unbleached fibers are admittedly less transparent because of their ligneous incrustation.

TABLE V

Per Cent Bleached Sulphite	Per Cent Unbleached Sulphite	Observed Brightness	Calculated Brightness
	100	59.13	
10	90	60.20	61.23
20	80	61.83	63.33
30	70	62.77	65.43
40	60	63.69	67.53
45	55	64.64	68.58
50	50	66.15	69.63
60	40	67.68	71.73
70	30	70.46	73.83
80	20	72.76	75.93
90	10	76.62	78.03
100		80.13	

In any sheet containing both fibers, there will be places at which bleached fibers located on the surface lie on top of unbleached fibers, and vice versa. Now when a beam of light falls on the bleached fiber backed by the unbleached fiber, much of the light will pass through the more transparent fiber and be absorbed by the less transparent fiber. The result will be that the presence of the more transparent medium will be minimized and the presence of the more opaque background will be accentuated. Similarly, when light falls on the less transparent fiber backed by the more transparent one, less light passes through than in the previous example, and when that which does is reflected from the background it must again pass through the less transparent medium. Again the effect is to accentuate the presence of the less transparent fiber and minimize that of the more transparent bleached fiber, with the result that the brightness of the mixture is lower than if calculated as a straight line function of their per cent presence and their individual brightness.

To offer evidence in proof of this hypothesis, several tabs were cut from each of two sheets of thin manifold paper of widely differing brightness but of the same caliper and basis weight. The tabs of the brighter sheet gave a brightness of 80.70 as against 61.57 for the duller one, 12 thicknesses being used in taking the readings. Now when these sheets were alternated, bright-dull-bright-dull, etc., with a bright sheet on the bottom to be first contacted by the light beam the average brightness of several such sets of tabs was 73.26. When they were similarly alternated, but with a dull sheet on the bottom, the brightness was 65.24. This means that the average brightness of the alternated tabs is 69.25 as against 71.13 for the average of the bright and dull tabs measured separately, and the expected deviation is evident and in the direction anticipated.

The next step was to place one dull sheet on the bottom

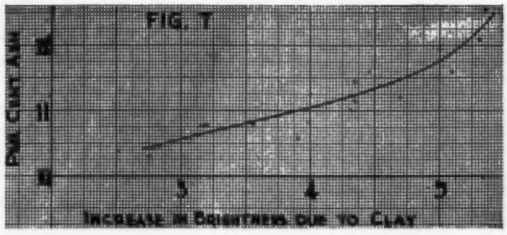
of a stack of bright sheets. This gave a brightness of 67.08. When the dull sheet was placed next to the bottom, the brightness increased to 73.71; when third from the bottom, to 76.35; when fourth, 78.22; when fifth, 79.05; when sixth, 79.91; and so on, until only when the dull sheet was placed eighth from the bottom in a pile of bright sheets or further, was the brightness the same as the stack of all bright sheets. This means that some of the light, in reading the bright sheets, passes through as many as seven sheets before being reflected.

Now when a stack of dull tabs was prepared with one bright sheet on the bottom to be first contacted by the light beam, the reading was 70.86. When the bright sheet was moved next to the bottom, the reading was 63.8; when third from the bottom, the brightness was 61.46 or the same as the stack of all dull sheets. This means that with the dull sheets the light beam is reflected by the first and second sheets and does not traverse beyond this point.

This difference in transparency and the considerations advanced in the hypothesis and their indicated substantiation, when applied to the case of the bleached and unbleached sulphite mixtures, offer an explanation for the phenomenon observed. It thus appears reasonable to conclude that in stock mixtures of this nature, the brightness obtainable is, and should be, less than that calculated on the basis of the individual brightness and per cent content of the components, and that this trend is accentuated as an equal proportion of the components is approached.

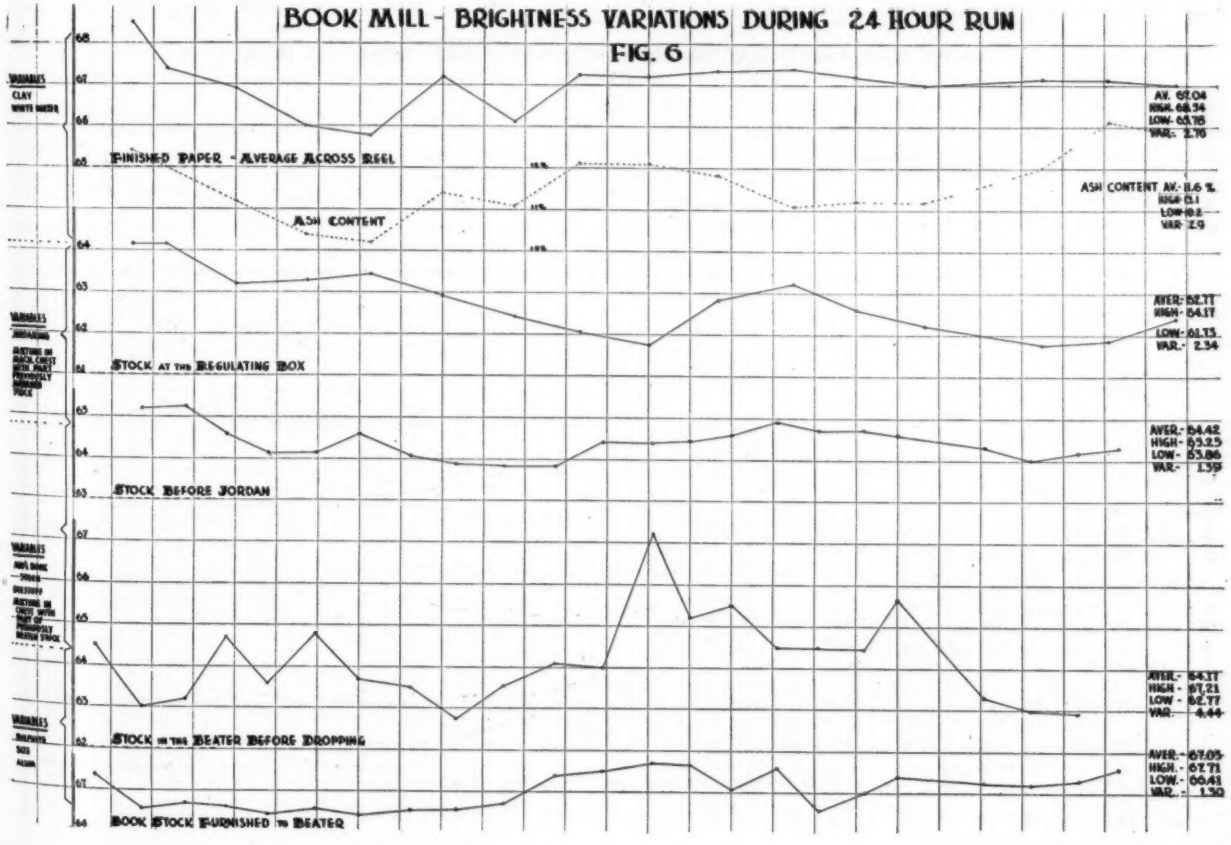
The Effect of Water

The purpose of this portion of the work was to determine whether the use of waters of varying turbidity would have an influence on brightness. A large sample of turbid water was obtained from the Fox River and the coarse



suspended matter filtered out through filter paper. The filtrate was still noticeably turbid, yet free from large agglomerates of foreign matter. Another sample of water was obtained from a nearby mill which was representative of commercially filtered water in use in the pulp and paper mills of the Fox River Valley. The degree of turbidity of this water was approximately matched with a mixture of two-thirds distilled water and one-third turbid river water. Hand sheets were formed using all distilled water, all turbid river water, and a mixture of two-thirds turbid river water and one-third distilled water.

This work was done on a bleached sulphite and repeated on a 50-50 soda-sulphite mixture. All the water for suspension of the stock and for dilution of the sheets in preparation was the water to be tested in each case, no tap or other water being used. Brightness of the sheets resulting is recorded in Table VI. While the differences are not clearly consistent, and are perhaps a little greater than can be attributed to experimental error, the conclusion to be drawn is that turbidity exercises relatively little influence on brightness, particularly since the differences produced by very turbid water as compared with distilled water are


BOOK MILL - BRIGHTNESS VARIATIONS DURING 24 HOUR RUN
FIG. 6
FINISHED PAPER - AVERAGE ACROSS REEL
ASH CONTENT
STOCK AT THE REGULATING BOX
STOCK BEFORE JORDAN
STOCK IN THE BEATER BEFORE DROPPING
BOOK STOCK FURNISHED TO BEATER

approximately within one point in brightness. Because these extreme cases indicated such a small effect, it was not considered worth while to repeat the experiment on a larger scale.

The normal variation in water turbidity within a paper mill is conceded to be well within the limits investigated. It is to be expected that on certain grades of paper a water purification system will prove advantageous where the color of the water is poor and where the water contains considerable material that can be coagulated with alum. The laboratory indications are that the difference between sized and unsized sheets prepared with distilled water is slightly less than when a more turbid water is used, but it does not appear that the turbidity factor is by any means sufficiently great to be considered of major importance.

TABLE VI

Water Used	Average Brightness: Bleached Sulphite	Average Brightness: 50-50 Soda-Sulphite
All distilled	78.25	74.43
All turbid river	78.28	73.35
½ turbid river } ½ distilled }	77.5	73.25

Paper Mill Studies

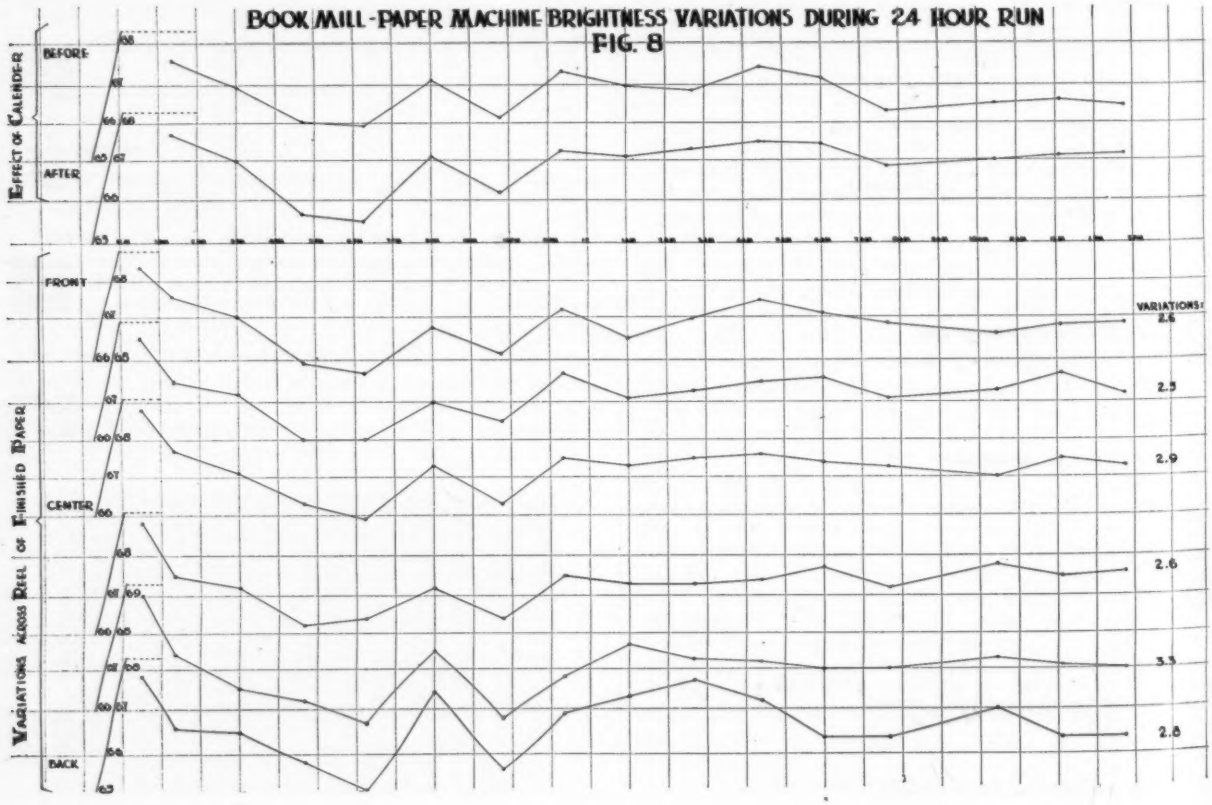
The object of this portion of the work was to follow in a book mill, a bond mill, and a groundwood-sulphite catalog mill, the brightness fluctuations throughout a run on any one grade of paper, and to locate the causes for variations by sampling stock or paper at appropriate stages in the manufacturing process. Thus, for example, samples of stock taken from the beaters at regular intervals or from the head box or regulating box before going on to the machine, as well as samples of paper before and after the calenders and across the full width of the reel, should present evidence, when tested for brightness, as to the cause of any variations in the finished paper and should indicate whether the original stock, the preparation of the stock, or the paper machine presents the greatest problem in the control of brightness.

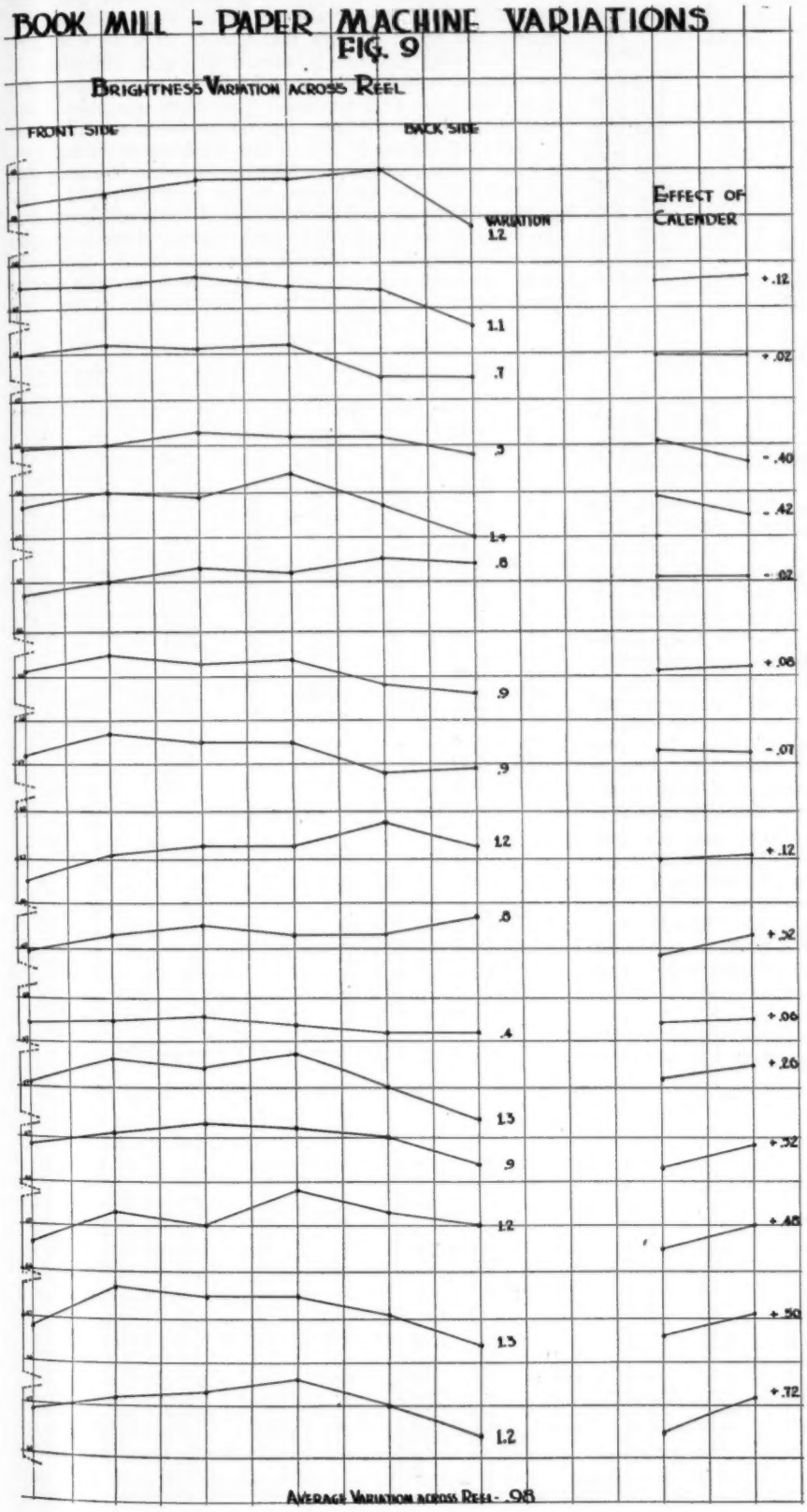
1. Book Mill.

In this mill, a 24 hour run of 45 pound tinted eggshell book paper was followed. The mill procedure was to furnish cooked book stock to the beaters in slush form, add baled unbleached sulphite, and after the beating period, to drop each beater with additional cooked book stock. This procedure necessitated the collection of two additional sets of wet samples, and sampling was done according to the following plan: A sample from every beater of the cooked book stock furnished to it; a sample from every beater before dropping; a sample of stock ahead of the jordan taken just prior to the dropping of each beater; a sample of stock from the regulating box before dilution, taken a few minutes before the completion of every other reel of paper; paper machine samples taken from the front side before and after the calender immediately preceding the completion of every other reel, and a sample across the full width of every other reel.

The wet samples were formed into hand sheets and these, together with the paper machine samples, were tested for brightness. Tables VII and VIII contain the data for the wet samples, and in Table IX is compiled the average brightness of the machine samples. The strips across the full width of the reel were tested on each end and at four equidistantly spaced intervals between the front and back side.

Fig. 6 illustrates graphically the brightness fluctuations of the stock samples as compared with the average brightness of the finished paper throughout the run. These curves are synchronized so that at any point on the curve for the finished paper there will be found plotted directly beneath, the brightness of the stock going into that paper.





It is quite evident that the cooked book stock maintained exceptionally uniform brightness. The large fluctuations of the stock in the beater before dropping are explained by the fact that the consistency of the cooked book stock varied appreciably, with the result that the ratio of sulphite to book stock at this stage in the process of manufacture was not constant. This was established to be the case by fiber analyses on the samples representing the brightest and dullest beater samples. It will be noted that the curve for stock in the beater before dropping reaches a peak about the middle of the run. This stock contained 40 per cent soda and 50 per cent bleached and unbleached sulphite (the remainder being contamination), while the stock representing a minimum brightness on the curve (the fourth sample preceding the maximum) contained 23 per cent soda and 75 per cent bleached and unbleached sulphite. However, this effect was minimized when the beaters were dropped with additional book stock, since the stock before jordaning ran very uniformly.

The curve for the stock at the regulating box is parallel throughout the run with the curve for the stock before jordaning. From this it is apparent that the effect of the jordan was not to introduce variations inconsistent with the brightness of the stock before jordaning, but merely to lower the average brightness from 64.4 to 62.7 or 1.7 points. It is true that there was a slightly greater fluctuation after the jordan (2.39 points) than before (1.34 points).

The dotted line in Fig. 6 between the curves for the stock at the regulating box and the average of the finished paper, illustrates the variation in ash content or the amount of filler retained. This curve accounts at nearly all points for the lack of uniformity or similarity between the two adjacent curves. Thus, during the first six hours, the stock at the regulating box dropped .5 of a point in brightness while the finished paper dropped 2.7 points. The ash content of the paper, however, dropped from 12.4 per cent to 10.2 per cent. Beyond this point

TABLE VII

Series A		Series B	Series C		Series D	
Sample No.	Time	Sample No.	Sample No.	Time	Sample No.	Time
1	12:00 Noon	4	6	1:45 P. M.	2	12:30 P. M.
3	12:55 P. M.	8	9	2:50 P. M.	5	1:10 P. M.
7	1:55 P. M.	12	13	3:50 P. M.	10	2:50 P. M.
11	3:00 P. M.	15	17	4:50 P. M.	16	4:35 P. M.
14	4:00 P. M.	19	20	5:50 P. M.	22	6:15 P. M.
18	4:50 P. M.	23	24	7:00 P. M.	26	7:55 P. M.
21	6:00 P. M.	27	28	8:15 P. M.	33	9:35 P. M.
25	7:10 P. M.	30	31	9:20 P. M.	38	11:15 P. M.
29	8:30 P. M.	34	35	10:30 P. M.	42	12:50 A. M.
32	9:30 P. M.	37	39	11:45 P. M.	48	2:35 A. M.
36	10:45 P. M.	41	43	12:55 A. M.	55	4:20 A. M.
40	12:00 Mid.	45	46	2:05 A. M.	60	5:55 A. M.
44	1:10 A. M.	49	50	3:00 A. M.	67	7:35 A. M.
47	2:20 A. M.	52	53	4:00 A. M.	73	10:20 A. M.
51	3:10 A. M.	56	57	5:05 A. M.	78	12:00 Noon
54	4:10 A. M.	59	61	6:05 A. M.	83	1:40 P. M.
58	5:15 A. M.	63	64	7:10 A. M.		
62	6:15 A. M.	66	68	8:00 A. M.		
65	7:30 A. M.	69	71	10:05 A. M.		
70	9:10 A. M.	74	75	11:10 A. M.		
72	10:20 A. M.	77	79	12:20 P. M.		
76	11:20 A. M.	81	82	1:20 P. M.		
80	12:30 P. M.					

NOTE: Series A—Book stock furnished to beater. Series B—Stock from beater after addition of sulphite. Series C—Stock from beater chest taken at jordan inlet after further addition of book stock. Series D—Stock from regulating box before dilution taken just before the completion of every other reel. 2500 pound beaters used. 1300 pounds of stock were in beater chest and 2500 pounds of stock in machine chest when the beaters were dropped.

the stock continued to fall off in brightness while the brightness of the finished paper increased, since the filler content increased, until at the middle of the run, when the stock brightness had reached a minimum, the paper was not duller because the filler content had meanwhile increased. Similarly, when the stock brightness subsequently increased, the finished paper ran uniformly because the filler content decreased. This brings out the relationship of clay or any filler in maintaining uniform brightness.

It is interesting to note the degree to which clay retained in the paper gives increased brightness. Except for the first two and last samples from the run, there is a very close relationship between these two items. The average brightness of any two consecutive samples of stock at the regulating box before going on to the machine was subtracted from the average brightness of the same two consecutive samples of paper made from this stock after the addition of the clay, and this compared with the average per cent ash of these papers, as indicated in Table X. When these data are plotted in Fig. 7, the importance of controlling filler content may be seen quite clearly, since a variation of 2 per cent in the ash content in this case would produce a brightness variation of over 2.5 points providing the stock did not vary.

Fig. 8 illustrates the variations at intervals across the reel of finished paper throughout the run, as well as before and after calendering. Fig. 9 is plotted from the same data and shows the brightness across each reel and the calendering effect on each reel tested. It is very evident that this paper machine presented no major difficulties in the control of brightness, that variations across the width of the machine were negligible (less than one point), and that the mild calendering (3 nips) produced no effect. It is true that the back side of the machine generally gave slightly duller paper, but it appears logical to conclude that the uniformity of brightness of the finished paper is dependent chiefly upon the uniformity of the stock going on to the machine, and that this in turn is partly dependent upon the uniformity of the filler content and partly dependent upon the uniformity of the stocks used, as well as the proportions of these stocks. Fluctuations in the raw

TABLE VIII

Series A		Series B		Series C		Series D	
Sample No.	Average Brightness	Sample No.	Average Brightness	Sample No.	Average Brightness	Sample No.	Average Brightness
1	67.36	4	64.56	6	65.21	2	64.14
3	66.54	8	63.01	9	65.25	5	64.17
7	66.70	12	63.21	13	64.60	10	63.20
11	66.63	15	64.70	17	64.15	16	63.30
14	66.42	19	63.61	20	64.18	22	63.46
18	66.56	23	64.82	24	64.62	26	62.93
21	66.41	27	63.69	28	64.09	33	62.44
25	66.54	30	63.51	31	63.92	38	62.07
29	66.52	34	62.77	35	63.86	42	61.73
32	66.73	37	63.51	39	63.86	48	62.85
36	67.41	41	64.11	43	64.46	55	63.22
40	67.49	45	64.02	46	64.40	60	62.61
44	67.71	49	67.21	50	64.45	67	62.20
47	67.67	52	65.17	53	64.61	73	61.77
51	67.07	56	65.56	57	64.92	78	61.87
54	67.62	59	64.47	61	64.73	83	62.38
58	66.55	63	64.54	64	64.72		
62	67.03	66	64.45	68	64.62		
65	67.40	69	65.67	71	64.33		
70	67.27	74	63.32	75	64.01		
72	67.21	77	62.99	79	64.19		
76	67.28	81	62.92	82	64.31		
81	67.62						
Average	67.03		64.17		64.42		
High	67.71		67.21		65.25		
Low	66.41		62.77		63.86		
Variation	1.30		4.44		1.39		

TABLE X.

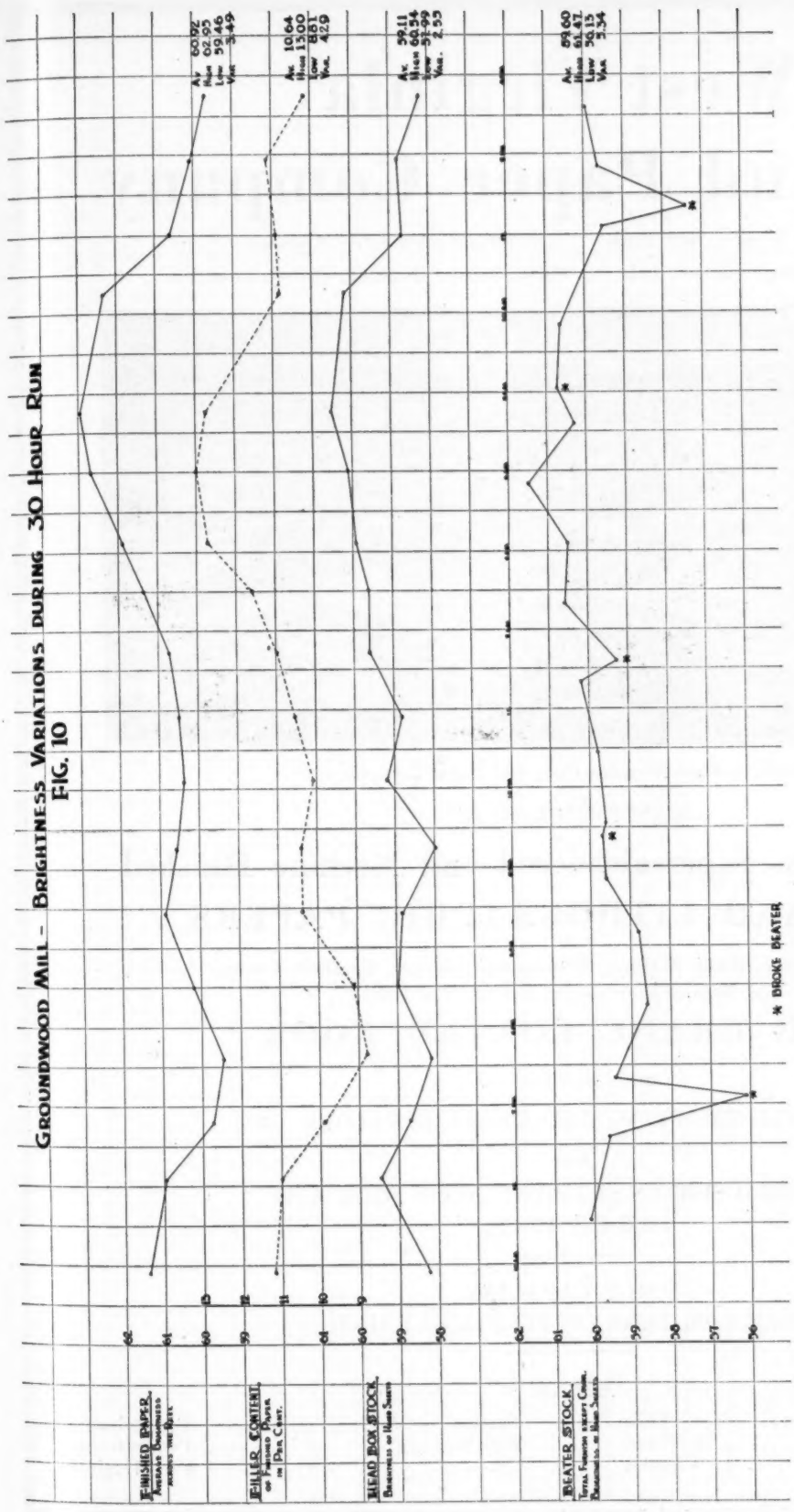
Time	Average Increase in Brightness *	Average Per
3:00 P. M. - 4:40 P. M.	3.2	10.8
4:40 P. M. - 6:15 P. M.	2.75	10.3
6:15 P. M. - 8:00 P. M.	3.55	10.8
8:00 P. M. - 9:45 P. M.	4.0	11.25
9:45 P. M. - 11:20 P. M.	4.45	11.6
11:20 P. M. - 1:00 A. M.	5.3	12.1
1:00 A. M. - 2:40 A. M.	5.0	11.95
2:40 A. M. - 4:25 A. M.	4.35	11.45
4:25 A. M. - 6:00 A. M.	4.35	11.15
6:00 A. M. - 7:40 A. M.	4.7	11.2
7:40 A. M. - 10:25 A. M.	5.1	11.6
10:25 A. M. - 12:05 P. M.	5.35	12.55

* Average increase in brightness between the stock at the regulating box and the finished paper.

TABLE IX.

Date	Time	B-C	A-C	C-E	0	1	2	3	4	5	Var.	Ave.	% Ash
12/5/34	12:30 P. M.	....	....	....	68.3	68.5	68.8	68.8	69.0	67.8	1.2	68.54	12.4
	1:20 P. M.	67.60	67.72	+.12	67.6	67.5	67.7	67.5	67.4	66.6	1.1	67.37	12.0
	3:00 P. M.	66.96	66.98	+.02	67.0	67.2	67.1	67.2	66.5	66.5	.7	66.91	11.2
	4:40 P. M.	66.06	65.66	—.40	65.9	66.0	66.3	66.2	66.2	65.8	.5	67.07	10.4
	6:15 P. M.	65.92	65.50	—.42	65.7	66.0	65.9	66.4	65.7	65.0	1.4	65.78	10.2
	8:00 P. M.	67.12	67.10	—.02	66.8	67.0	67.3	67.2	67.5	67.4	.7	67.19	11.4
	9:45 P. M.	66.14	66.22	+.08	66.1	66.5	66.3	66.4	65.8	65.6	.9	66.12	11.1
	11:20 P. M.	67.32	67.24	—.08	67.2	67.7	67.5	67.5	66.8	66.9	.9	67.26	12.1
12/6/34	1:00 A. M.	66.98	67.10	+.12	66.5	67.1	67.3	67.3	67.7	67.3	1.2	67.20	12.1
	2:40 A. M.	66.88	67.30	+.52	66.9	67.3	67.5	67.3	67.3	67.7	.8	67.34	11.8
	45:25 A. M.	67.46	67.52	+.06	67.5	67.5	67.6	67.4	67.2	67.2	.4	67.39	11.1
	6:00 A. M.	67.18	67.44	+.26	67.1	67.6	67.4	67.7	67.0	66.4	1.3	67.20	11.2
	7:40 A. M.	66.32	66.84	+.52	66.9	67.1	67.3	67.2	67.0	66.4	.9	66.97	11.2
	10:25 A. M.	66.52	67.00	+.48	66.6	67.3	67.0	67.8	67.3	67.0	1.2	67.16	12.0
	12:05 P. M.	66.62	67.12	+.50	66.8	67.7	67.5	67.5	67.1	66.4	1.3	67.16	13.1
	1:45 P. M.	66.46	67.18	+.72	66.8	67.2	67.3	67.6	67.0	66.4	1.2	67.05	12.8
Average		66.76	66.99	+.23	66.86	67.20	67.23	67.31	67.03	66.65	.98	67.04	11.6
High		67.60	67.72	+.72	68.3	68.5	68.8	68.8	69.0	67.8	1.4	68.54	13.1
Low		65.92	65.50	—.42	65.7	66.0	65.9	66.2	65.7	65.0	.4	65.78	10.2
Variation		1.68	2.22	1.14	2.6	2.5	2.9	2.6	3.3	2.8	..	2.76	2.9

KEY: B-C—Front side before calender. A-C—Front side after calender. C-E—Calender effect. 0—Extreme front side of sample across reel. 5—Extreme back side of sample across reel. 1, 2, 3, 4—Between front and back side; spaced equally. Var.—Variation across reel. Ave.—Average across reel.



stock and variations from beater to beater are naturally minimized later on in the process by admixture with stock already in the beater and machine chests.

2. GROUNDWOOD-SULPHITE CATALOG MILL.

In this mill, a 30 hour run of 22½ pound printing paper was followed. Samples were collected from the beaters at approximately two hour intervals, and samples were obtained from every broke beater dropped. The furnish consisted of 25 per cent unbleached sulphite in slush form, 30 per cent groundwood in laps, and 45 per cent mixed stock in slush form. This latter was made up of 50 per cent reworked paper stock and 50 per cent of another groundwood. Samples of these individual stocks were obtained once during each shift. Stock samples from the machine head box were taken approximately every hour and a half simultaneously with strips of paper from the front side of the machine before and after the calenders and across the full width of the reel. Hand sheets were formed from the stock samples, and brightness readings were made on these and on the machine samples as in the preceding study.

Tables XI, XII, and XIII contain the data on sampling and on brightness. Fig. 10 shows in synchronized curves the relation between fluctuations in stock and in the finished paper throughout the run. It is self-evident that, in spite of an overall fluctuation of 5.3 points of the stock in the beater, subsequent admixture with stock in the beater and machine chests decreased the variation to 2.5 points as the stock went on to the machine. Mechanical action of the beaters and jordan lowered the average brightness one-half point. Two of the five broke beaters dropped contained stock considerably duller than the average beater stock, and this effect was carried through to the head box stock and the finished paper, although to not so marked a degree.

The groundwood, bleached and unbleached sulphite, and reworked stocks furnished to the beater ran uniformly, the groundwood varying 1.9 points, the unbleached sulphite 1.9 points, and the mixed stock 1.1

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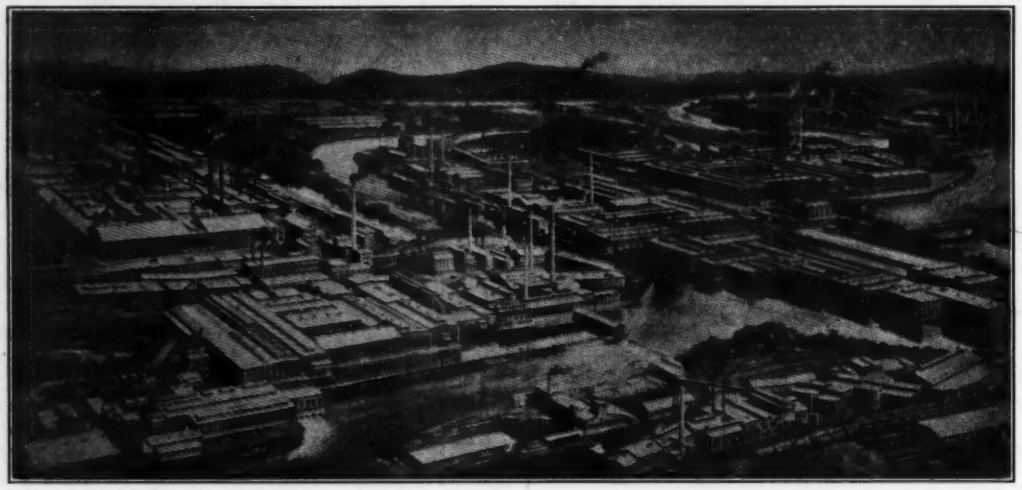

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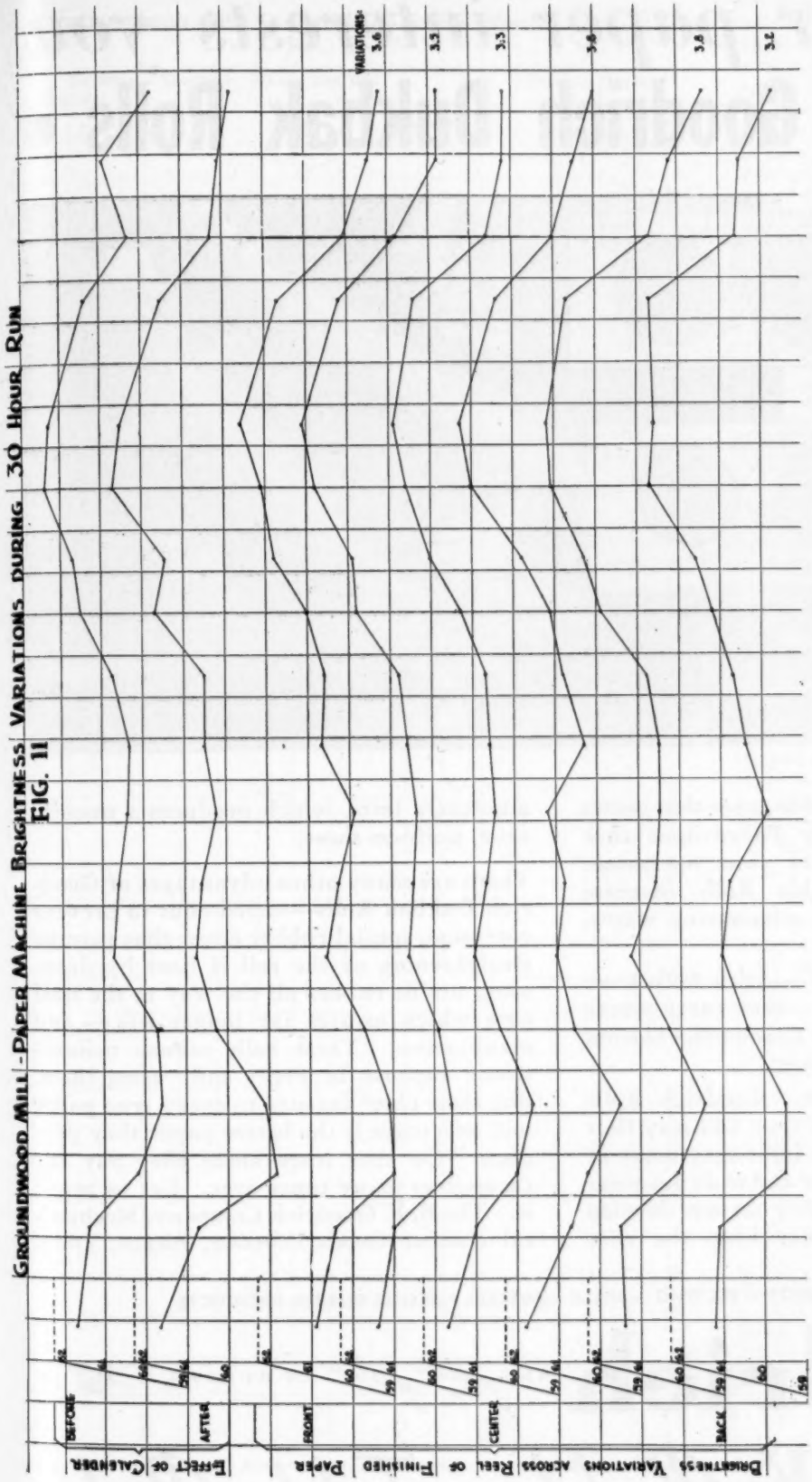

FIG. 11

points. Disregarding the broke beaters, the beater stock varied 2.9 points, which is reasonable since the over-all variation of a mixture should exceed the variation of any one of the components.

The curve illustrating the brightness of the finished paper is reasonably parallel to that for the stock from which this paper was made. However, it fluctuates approximately one point more throughout the run, and the explanation is that the clay is retained in the mill-made sheet more than in the laboratory hand sheets made from the same stock. This is illustrated by the dotted line representing the ash content of the finished paper. It will be noted that at nearly all points any brightness change in the finished paper, which is inconsistent with the stock from which the paper was made, is accountable for by an increase or decrease in the filler retained. Thus, the maximum reached near the end of the run is more pronounced in the finished paper than in the head box stock, since at this point the filler content reached a maximum, indicating that as the clay increased it was retained better in the mill-made sheet and that this factor was largely responsible for the brightness variation resulting.

It would appear that the two dull broke beaters were deficient in clay as compared with the other broke beaters and as compared with the beaters furnished with fresh stock, because of the low clay content of the paper made at these points. Also, in view of the striking similarity in the curves for the clay content and brightness of the finished paper, it is logical to conclude that, had the clay been held at a constant value throughout the run, the brightness variations in the resulting paper would have been greatly minimized and so slight as to be considered negligible.

In this run pH, freeness, and consistency data were collected on all the beater and head box samples, as will be seen from Table XI. There appears to be no relationship between any of these factors

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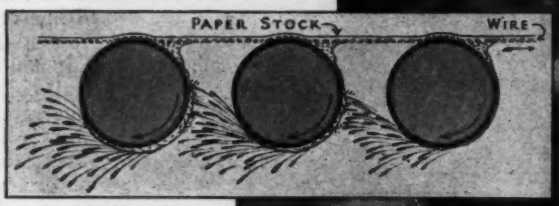

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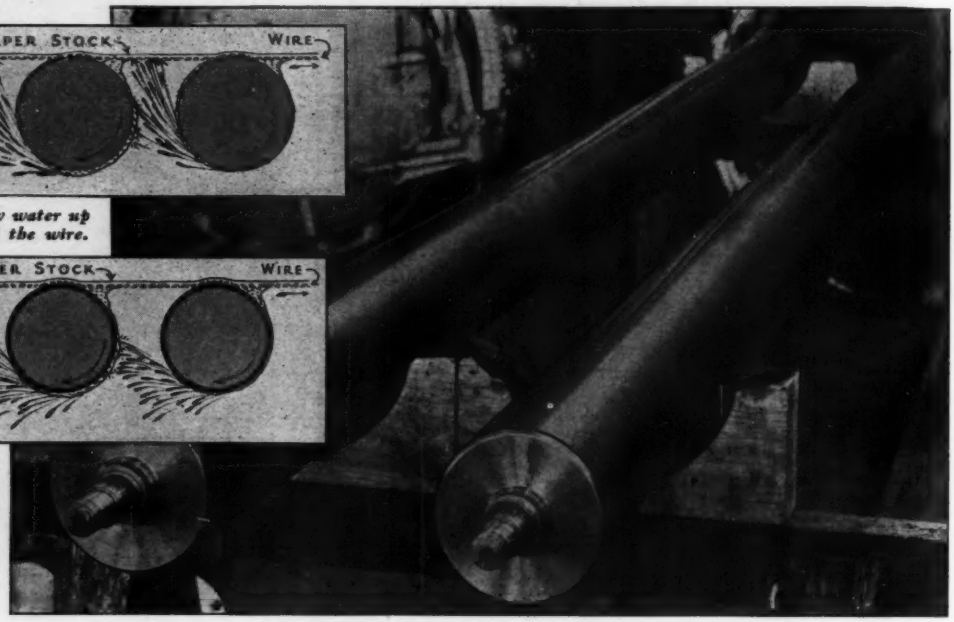

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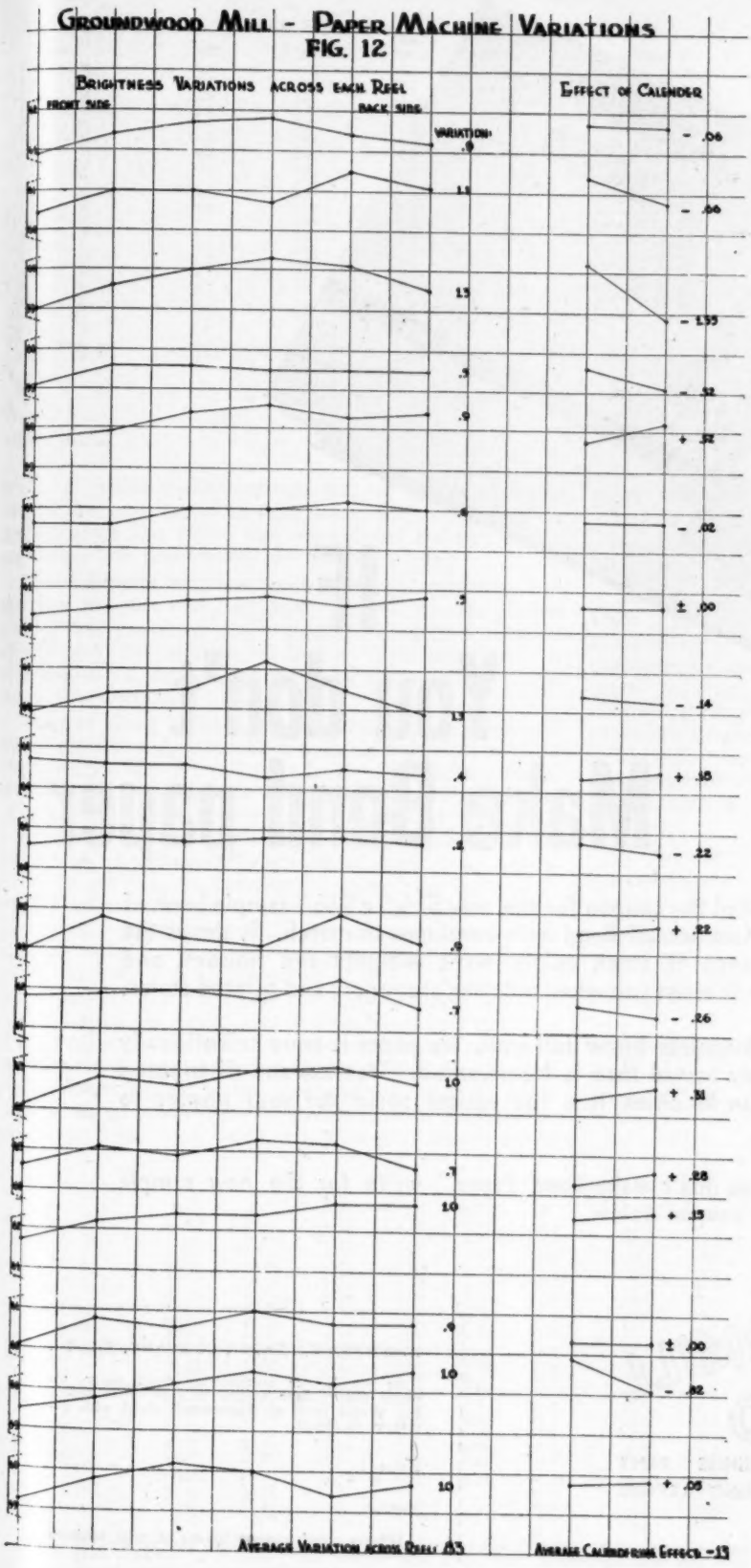

and brightness. It would be expected that, had the freeness varied over a wider range, its effect would be evident to a certain extent when discounted by the more influential items of clay content and broke stock.

Table XIII and Figs. 11 and 12 contain the results of the paper machine samples. It is apparent that this paper machine, as in the case of the book mill, produced paper of uniform brightness across its entire width and that fluctuations from time to time throughout the run are attributable to factors already discussed and not to any inherent property of the machine.

The calender lowered the brightness on the average of 0.2 of a point, although the paper received nine nips on the stack and increased in gloss from 20.0 per cent to 44.5 per cent as read by the Ingersoll Glarimeter. That the brightness was sometimes apparently raised by calendering is due partly to experimental error and partly to the fact that it was impossible to take readings on the paper at exactly the same point before and after passing through the calender, although every effort was made to obtain samples from the same locality in the sheet.

Moisture in the paper before and after calendering was obtained as indicated in Table XIII. However, there appears to be no relation whatever between this factor and the degree to which calendering altered the brightness. The reason is likely because of the small differences, for had there been large variations in moisture, some brightness reaction to this should result.

3. Bond Mill.

In this mill, a 6 hour run of 20 pound bond paper was followed, the furnish being approximately 80 per cent bleached softwood sulphite, 10 per cent hardwood sulphite, and 10 per cent soda. Stock samples were obtained from each beater dropped and from the regulating box before the stock went on to the machine. Samples of paper before the size tub, before and after the calender, and across the full width of each reel were obtained.

The accumulated data are recorded in Tables XIV and XV. Fig. 13 illustrates, as in the preceding mill studies, the brightness variations throughout the run. It is quite evident here that the fluctuation at any time was very slight and that, although the beater and regulating box samples varied 1.7 and 1.4 points respectively, the finished paper ran with remarkable uniformity with only 0.6 of a point variation from reel to reel throughout the six hours.

The stock samples from the beaters were of almost identical brightness except for the first beater and, disregarding this beater, varied less than 0.4 of a

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TABLE XI.

	BEATER STOCK				HEAD BOX STOCK				
Time	pH	Freeness	Consistency	Average Brightness	Time	pH	Freeness	Consistency	Average Brightness
9:55 A. M.	5.2	118	5.5	60.10	9:35 A. M.	4.5	90	3.05	58.23
11:30 A. M.	5.1	112	5.1	59.59	12:05 P. M.	5.1	118	3.7	59.46
*12:30 P. M.	5.2	118	5.05	56.13	1:35 P. M.	5.2	105	3.85	58.68
1:00 P. M.	5.0	122	5.0	59.46	3:20 P. M.	4.9	113	3.65	58.16
2:50 P. M.	4.7	124	5.25	58.60	5:00 P. M.	4.7	115	3.70	58.99
4:40 P. M.	4.7	143	5.3	58.80	6:40 P. M.	4.7	120	4.0	58.85
6:00 P. M.	4.5	140	5.25	59.63	8:20 P. M.	4.7	125	3.75	57.99
* 7:05 P. M.	4.5	134	5.6	59.68	10:10 P. M.	4.7	126	4.0	59.20
7:25 P. M.	4.8	135	5.0	59.60	11:45 P. M.	4.7	112	3.75	58.81
9:15 P. M.	4.5	137	4.95	59.83	1:15 A. M.	4.7	106	3.5	59.59
11:00 P. M.	4.9	142	5.15	60.19	2:50 A. M.	4.7	116	3.65	59.62
*11:30 P. M.	4.5	130	5.95	59.27	4:20 A. M.	4.7	117	3.6	59.92
1:00 A. M.	4.7	136	5.15	60.58	6:00 A. M.	4.7	105	3.7	60.13
2:30 A. M.	4.7	131	5.0	60.52	7:30 A. M.	4.7	108	3.65	60.54
4:00 A. M.	4.7	128	5.05	61.47	10:15 A. M.	4.9	114	3.75	60.19
5:30 A. M.	4.7	134	4.95	60.27	12:00 Noon	4.7	110	3.55	58.68
* 6:25 A. M.	4.6	126	4.9	60.75	1:30 P. M.	4.7	108	3.45	58.80
8:00 A. M.	4.6	123	5.05	60.64	3:15 P. M.	4.7	110	3.6	58.22
10:30 A.M.	4.7	130	5.25	59.54					
*11:00 A. M.	4.7	125	4.9	57.43					
12:00 Noon	4.6	124	4.95	59.64					
1:30 P. M.	4.6	120	4.75	59.95					
Average		128.7		59.60			112.1		59.11
High		143.0		61.47			126.0		60.54
Low		112.0		56.13			90.0		57.99
Variation				5.34					2.55

* Broke Beaters

point. It is reasonable to assume that an error in sampling caused the first beater to read somewhat over one point higher, since this effect was not carried through to the regulating box samples and the finished paper.

The difference between the beater and regulating box samples involves the mechanical action of the jordan (which has previously been proven to exert a constant effect) and the addition of broke. This latter item is responsible for the gradual rise in brightness of the regulating box samples.

The tub sizing process and the calender each lowered the brightness a fraction of a point (7 and 4 of a point respectively) but did not introduce any abnormal variations, and it may again be concluded that the paper machine presents no difficulties in the control of brightness.

As a result of these mill studies, it is apparent that the production of uniformly bright paper is far from impossible. In one mill, the extreme variation from reel to reel was 2.7 points, the reason being a lack of control of the filler used. In another mill, the extreme reel to reel variation was 3.5 points, attributable to rather large fluctuations in filler and an uncontrolled use of broke stock. In the third mill, the extreme variation was only 0.6 of a point. Hence, the exercise of a little care along the lines of stock selection and extent of filler content (if any) will enable the manufacturer to remain well within the intended grade. Since a great many paper making variables exert so slight an influence upon the evenness of brightness, the task is far from complicated and reduces to the relatively simple matter of controlling furnish.

The Effect of Dyestuffs

Thus far, the subject of dyestuffs has not been mentioned because it was first desired to establish whether it was possible for a mill to run uniformly bright paper from a given furnish. Since this is possible through the exercise of a reasonable degree of technical control as evidenced by the foregoing data, it will be of primary interest to learn whether a desired brightness may be obtained through the application of dyestuffs to a furnish of known brightness.

The effect upon brightness of all the soluble dyestuffs and pigments commonly used in the tinting of whites has been extensively investigated. Widely applied members

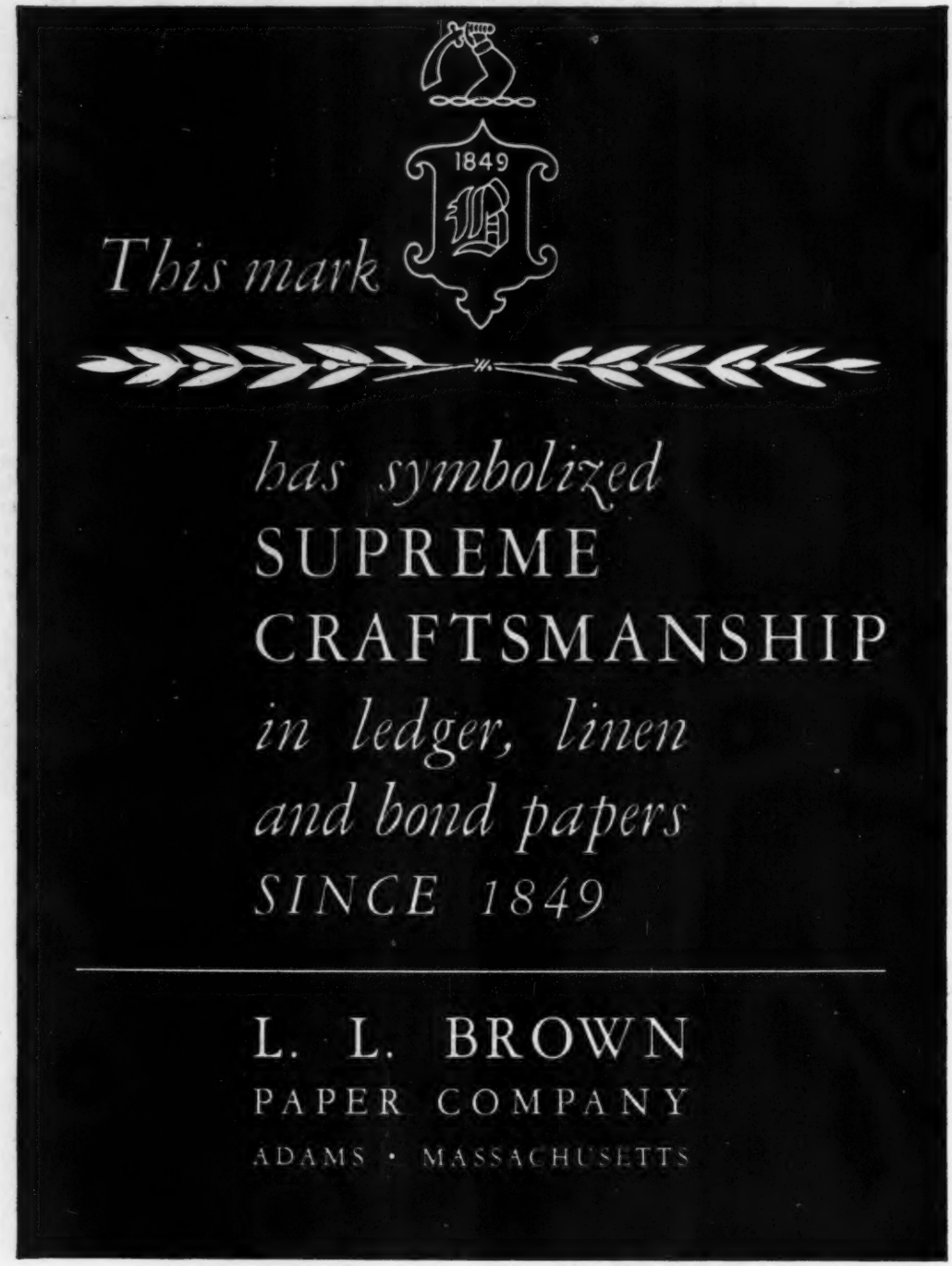
TABLE XII.

Stock	Date	Time	Brightness
Lap Groundwood	12/5/34	3:10 A. M.	51.51
	12/5/34	12:00 P. M.	52.82
	12/5/34	7:20 P. M.	52.94
	12/6/34	7:00 A. M.	53.43
Slush Groundwood	12/5/34	11:30 A. M.	55.54
	12/5/34	7:00 P. M.	55.84
	12/6/34	3:00 A. M.	56.97
	12/6/34	11:00 A. M.	56.64
Reworked Stock	12/5/34	6:30 P. M.	51.26
	12/6/34	4:30 A. M.	50.20
	12/6/34	11:00 A. M.	51.38
Mixed Stock (Slush Groundwood and Reworked)	12/5/34	12:00 Noon	52.25
	12/5/34	7:00 P. M.	53.19
	12/6/34	3:00 A. M.	52.87
	12/6/34	12:00 Noon	53.32
Slush Unbleached Sulphite	12/5/34	12:00 Noon	61.07
	12/5/34	7:15 P. M.	60.91
	12/6/34	3:00 A. M.	59.62
	12/6/34	12:00 Noon	61.56

TABLE XIII

Time	B-C	A-C	C-E	MBC	MAC	0	1	2	3	4	5	Var.	Ave.	% Ash
9:50 A. M.	61.70	61.64	—.06	6.25	5.75	60.9	61.4	61.7	61.8	61.4	61.2	.9	61.40	11.18
12:15 P. M.	61.40	60.74	—.66	6.75	6.40	60.4	61.0	61.0	60.7	61.5	61.1	1.1	60.95	10.98
1:35 P. M.	60.20	58.85	—1.35	7.00	6.25	59.0	59.6	60.0	60.3	60.1	59.5	1.3	59.75	9.90
3:10 P. M.	59.62	59.10	—.52	6.90	6.00	59.1	59.6	59.6	59.5	59.5	59.5	.5	59.46	8.81
5:00 P. M.	59.72	60.24	+.52	6.60	7.00	59.7	59.9	60.4	60.6	60.3	60.4	.9	60.21	9.12
6:45 P. M.	60.76	60.74	—.02	7.60	6.60	60.6	60.6	61.0	61.0	61.2	61.0	.6	60.90	10.40
8:30 P. M.	60.62	60.62	±.00	6.50	6.60	60.3	60.5	60.7	60.8	60.6	60.8	.5	60.60	10.40
10:10 P. M.	60.40	60.26	—.14	6.80	6.00	59.9	60.4	60.5	61.2	60.5	59.9	1.3	60.40	10.09
11:50 P. M.	60.34	60.52	+.18	6.40	6.30	60.7	60.6	60.6	60.3	60.5	60.4	.4	60.51	10.54
1:25 A. M.	60.74	60.52	—.22	6.10	5.75	60.6	60.8	60.7	60.8	60.8	60.7	.2	60.73	10.97
3:00 A. M.	61.48	61.70	+.22	6.50	6.00	61.0	61.8	61.3	61.1	61.9	61.2	.9	61.38	11.60
4:20 A. M.	61.72	61.46	—.26	6.90	6.10	61.8	61.9	62.0	61.8	62.3	61.6	.7	61.90	12.69
6:00 A. M.	62.40	62.71	+.31	6.00	5.75	62.1	62.8	62.6	63.0	63.1	62.7	1.0	62.71	13.00
7:30 A. M.	62.32	62.60	+.28	6.25	5.90	62.6	63.1	62.9	63.3	63.2	62.6	.7	62.95	12.75
10:25 A. M.	61.38	61.54	+.16	6.60	6.00	61.7	62.2	62.4	62.4	62.7	62.7	1.0	62.35	9.84
12:00 Noon	60.30	60.30	±.00	6.25	6.00	60.1	60.8	60.6	61.0	60.7	60.6	.9	60.63	9.93
1:45 P. M.	60.92	60.10	—.82	6.40	6.25	59.5	59.8	60.2	60.5	60.2	60.5	1.0	60.11	10.14
3:30 P. M.	59.77	59.82	+.05	7.75	6.80	59.2	59.8	60.2	60.0	59.4	59.7	1.0	59.71	9.18
Average	60.88	60.74	—.13	6.64	6.19	60.51	60.92	61.02	61.12	61.10	60.89	.83	60.92	10.64
High	62.40	62.71	....	...	...	62.6	63.1	62.9	63.3	63.2	62.7	..	62.95	13.00
Low	59.62	58.85	....	...	...	59.0	59.6	59.6	59.5	59.4	59.5	..	59.46	8.81
Variation	2.78	3.86	....	...	...	3.6	3.5	3.3	3.8	3.8	3.2	..	3.49	4.19

KEY: B-C—Brightness before calender. A-C—Brightness after calender. C-E—Calender effect. MBC—Moisture before calender. MAC—Moisture after calender. 0—Extreme front side of strip across reel. 5—Extreme back side of strip across reel. 1, 2, 3, 4—Between front and back; spaced equally. Var.—Variation across reel. Ave.—Average across reel.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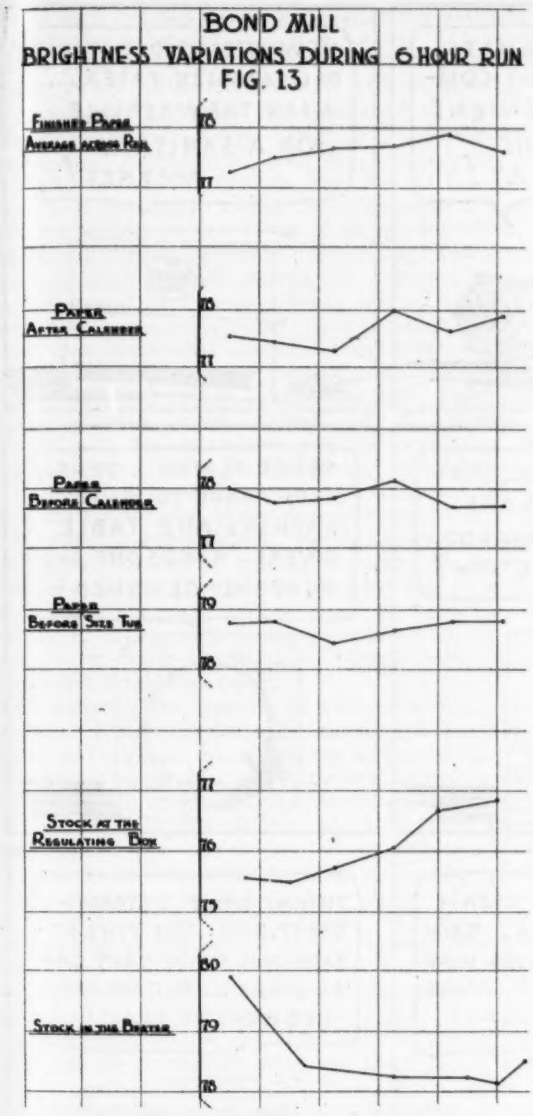

of the basic and acid class, phospho-tungstic lakes, mineral pigments, and vat color pigments were dyed individually at varying concentrations up to heavy tints, so that the relationship between the strength of the dyeing and the resulting brightness could be established. In supplement to this, other dyestuffs of the same classes, as well as members of the direct class were similarly investigated for the purpose of determining how dyestuff hue affects brightness and what dyestuffs possess the most marked

TABLE XIV
STOCK SAMPLES

Beater		Regulating Box	
9:30 A. M.	79.89	11:45 A. M.	75.57
11:00 A. M.	78.46	12:30 P. M.	75.48
12:45 P. M.	78.25	1:15 P. M.	75.74
2:10 P. M.	78.26	2:15 P. M.	76.07
3:00 P. M.	78.14	3:00 P. M.	76.68
3:45 P. M.	78.52	4:00 P. M.	76.85
Average	78.58		76.06
High	79.89		76.85
Low	78.14		75.48
Variation	1.75		1.37

dulling properties as read by the brightness tester. The next step was to apply combinations of these dyestuffs in a variety of ways, ranging from common practice to the use of strikingly contrasting combinations.

The results were not at all what might ordinarily be expected. Some dyestuffs apparently exert no dulling effect whatever, even when used in amounts far in excess of tinting strengths. Others do not dull when applied in small amounts but dull slightly as concentration is increased. Still others dull rapidly. When these dyestuffs are used in combination, the result is in all cases the additive effect of the individual dulling properties. Thus, the use of a dyestuff which does not produce dulling, together with one which dulls slightly, produces the same brightness as if only the latter were present, while the use of two dyestuffs each having a definite dulling action results in a dulling equal to the sum of their respective dulling properties.

There is one question which is usually asked in discussing the relationship between dyestuffs and brightness, namely: Are there any dyestuffs which will increase brightness? The answer is quite definitely: No. There are no dyestuffs—and this includes soluble anilines, phospho-tungstic lakes, vat pigments and mineral pigments—which, when used in amounts up to and somewhat in excess of moderately heavy tints, will exert any brightening action over that obtainable from the stock to which they are applied.

In this connection, two other questions arise. First: What will be the effect on a very dull stock of a dyestuff which does not dull a very bright one? The answer is: The same effect. It will not raise the brightness of the duller stock. Secondly: Will a dyestuff which exerts a definite dulling action on a dull stock exert the same action on a brighter stock, or will it dull the brighter stock to a greater degree? The answer is: It will have approximately the same effect regardless of the stock on which it is used.

It must be remembered that this work concerns the tinting of whites and that the above remarks are restricted to the tinting of whites. Obviously, the effects are not evidenced to exactly the same degree when tinting strengths are exceeded.

A general statement can be made concerning the tinting of paper and brightness. It is that the brightness of the stock appears to be the maximum brightness obtainable

TABLE XV
PAPER SAMPLES

Time	B-T	B-C	A-C	C-E	0	1	2	3	4	5	Var.	Ave.
12:30 P. M.	78.78	77.98	77.54	—.44	76.6	77.5	77.5	77.4	77.4	77.5	.9	77.31
1:15 P. M.	78.81	77.76	77.44	—.32	77.2	77.6	78.0	77.8	77.5	77.2	.8	77.55
2:15 P. M.	78.45	77.86	77.28	—.58	77.1	77.6	78.2	78.2	77.5	77.7	1.1	77.71
3:15 P. M.	78.66	78.14	78.02	—.12	77.5	77.9	77.9	78.0	77.7	77.6	.5	77.76
4:10 P. M.	78.80	77.68	77.64	—.04	77.7	77.9	78.1	78.0	77.9	78.0	.4	77.93
5:05 P. M.	78.80	77.68	77.90	+.22	77.1	77.7	77.8	77.9	77.8	77.6	8	77.65
Average	78.71	77.85	77.63	—.22	77.20	77.70	77.91	77.88	77.63	77.60	.75	77.65
High	78.81	78.14	78.02		77.7	77.9	78.2	78.2	77.9	78.0		77.93
Low	78.45	77.68	77.28		76.6	77.5	77.5	77.4	77.4	77.2		77.31
Variation	.36	.46	.74		1.1	.4	.7	.8	.5	.8		.62

KEY: P-T—Brightness before tub sizing. B-C—Brightness before calender. A-C—Brightness after calender. C-E—Calender effect. 0—Extreme front side of strip across reel. 5—Extreme back side of strip across reel. 1, 2, 3, 4—Between front and back; spaced equally. Var.—Variations across reel. Ave.—Average across reel.

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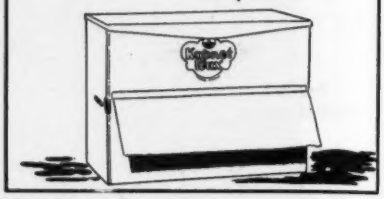

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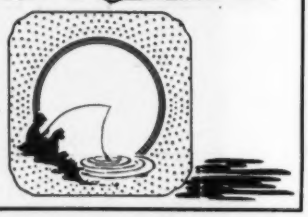

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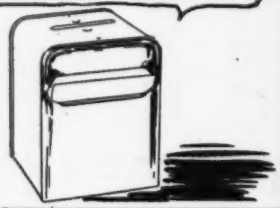

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MENASHA, WISCONSIN

and that each dyestuff exerts a characteristic influence on this brightness as concentration is increased. It is possible to tint a given stock in a variety of hues ranging from a greenish yellow to a reddish blue without altering the brightness, merely through the application of those dyestuffs which exert no dulling action or a very very slight dulling action. Furthermore, dyestuffs possessing this property are to be found in both the fugitive and fast-to-light types. It is possible to add to this same stock a dyestuff exerting a definite dulling action in an amount which, for example, will drop the brightness three points. Now through the use of those dyestuffs exerting no dulling action, it is possible to produce a range of tints similar to the above except that they are uniformly three points duller. It is readily conceivable that some of these duller tints will appear to the eye as more pleasing than certain of the brighter tints, and this is exactly the case. However, if the most pleasing of the brighter tints are selected and compared with the most pleasing of the duller tints, those actually brighter will appear to the eye as brighter.

This is merely another manner of stating that the General Electric Reflection Meter does measure those properties for which it was designed. Were this not the case, the fundamental purpose of grading according to brightness would be defeated, and it is with a great deal of satisfaction that the statement can be made that grading, as a necessity to the present economic stability of the paper industry, is being legitimately administered in part through the brightness tester.

This brings up the question of what constitutes a pleasing shade. It is granted that the human eye is not infallible and what appears most pleasing to one observer may not appear so to another. Nevertheless, there is a marked consistency with which several observers will select a certain blue white slightly on the red as the most pleasing tinted white.

A serious effort was made to obtain a scientific definition of a pleasing shade by examining a variety of tints with the Hardy Recording Color Analyzer. It is true that the most pleasing shades exhibit a characteristic curve but it would appear that this, or any other color measuring device, falls short of the human eye at two points—at least with regard to the tinting of white paper—in that very slight differences in hue and very slight differences in the strength of the dyeing are more significant to the human eye.

As previously intimated, paper may be dulled by certain dyestuffs. But it does not follow that all dulling agents exhibit the same reaction to the eye as regards pleasing shade. This means that it is possible to apply dulling agents, together with dyestuffs which do not dull, and produce a more pleasing tinted white than if other dulling agents had been employed. It does not mean that one can "fool the brightness tester." It merely signifies that a variety of tints are obtainable each possessing the same brightness, and that through the proper selection of dyestuffs a pleasing shade may be built at any brightness equal to or less than the brightness of the stock used. If stock A, for example, is two points duller than stock B, it will be possible in some instances to tint stock A to a very pleasing shade and make it appear more acceptable than stock B. But if stock B has been tinted to the most pleasing white, it is not possible under any consideration to make stock A appear brighter.

For the purpose of confirmation, it was demonstrated in an actual mill trial that a pleasing tint could be built without lowering the brightness and also that, through the application of the proper dulling agents and subsequent tinting with dyestuffs which do not dull, a pleasing tint might be produced at any desired brightness consonant with that of the stock involved. Actually, the brightness was dropped over a range of 4.5 points (it could have been done further, if desired) and a paper of a pleasing quality to the human eye was produced in each case. Thus it is possible, when the stock is too bright, to dull it to a point within the intended brightness grade and still produce a saleable paper. This condition permits a certain flexibility of tinting within each grading limitation, and the manufacturer who can build the most pleasing tinted white within the desired brightness range is the one who should find the most ready market.

Appendix

(1) Preparation of Hand Sheets:

Three grams of stock in water suspension were formed on a 6 x 6 inch Valley sheet mould in the usual manner and the wet web couched off with a new, clean, white blotter, care being exercised to place the wire side of the blotter next to the web and in the same relative position each time with reference to the machine direction of the blotter. Another blotter was similarly placed next to the wire side of the couched sheet and the sheet thus protected by blotters was placed between dry felts and pressed at 50 pounds pressure for 30 seconds. For drying, the sheet was placed between two new blotters and held under definite tension against the metal surface of a steam heated drier by means of a canvas cover.

The significant factor in the formation of uniform hand sheets for brightness readings is to perform the operation in exactly the same manner each time, particularly regarding wire and felt sides and machine direction of the blotters used. Time and degree of pressure, as well as basis weight of the sheet, exert relatively little influence, but time and method of drying is important.

(2) Testing Hand Sheets for Brightness:

The hand sheets were prepared in duplicate or triplicate, and one of these cut into 1½ by 2 inch tabs. Brightness readings were taken on the felt side of the tabs and on the felt sides of the uncut hand sheets, these being backed up by the tabs for each reading according to the standard procedure used in the operation of the General Electric Reflection Meter. It is extremely important to designate arbitrarily some particular direction of the hand sheet as the machine direction, and place all samples for brightness readings on the Reflection Meter with this direction in the same relative position each time.

A minimum of ten readings was averaged for the brightness of each sample and, in cases where it was difficult to prepare uniform sheets because of the condition of the stock, as many as fifty readings were averaged.

Utilization of German Pine for Newsprint

Researches conducted in recent months by German forestry interests in an endeavor to produce newsprint paper from domestic pine lumber have apparently been successful, Vice Consul C. T. Zawadzki, Berlin, states in a report made public by the Commerce Department.

German pine lumber, it is pointed out, was formerly regarded as unsuitable for newsprint paper because of its heavy rosin content. A process has now been developed, which reduces the rosin content during the grinding stage so that a technically usable wood pulp is obtained.

The possibility of using domestic pine in newsprint production, Vice Consul Zawadzki states, is considered important in view of the country's foreign exchange shortage. Annual imports of foreign pulpwood into Germany have amounted to approximately 2,500,000 tons, with a total value of approximately 46,000,000 reichsmarks.

1935 LOCKWOOD'S DIRECTORY of the PAPER & ALLIED TRADES Edition

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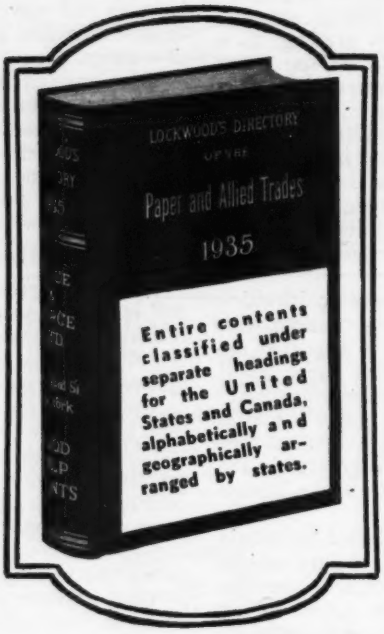
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1935
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An Open Letter to the Paper and Paper Board Manufacturing and Converting Industries

W. W. Pickard, Coordinator for the Paper Industries has written an open letter to the members of the Paper and Paperboard Manufacturing and Converting Industries in which he points out that the efforts of the graphic arts industry to impose their code on parts of the paper industry creates a very serious situation which requires immediate attention. Mr. Pickard's letter in full follows:—

The Graphic Arts Code Authority is engaged in an active campaign to bring under the jurisdiction of its code all of your printing operations and other operations of a graphic character.

If they are successful the fact that such operations are mere incident to the manufacture of your product will not exempt you from the Graphic Arts Code.

You will be obliged to pay every employee engaged wholly or in part in printing or on any other graphic arts process the wages prescribed by the Graphic Arts Code, and you will be called upon to contribute to the expense of administering that code.

Many of you have already been annoyed and harassed by the efforts of the Graphic Arts Code Authority to compel you to comply with the provisions of its Code and the whole issue is now coming to a head. The Paper Industries have united to fight Graphic Arts aggression and the purpose of this letter is to give you a picture of the situation from both a legal and a practical standpoint.

Every code covering the manufacture of conversion of paper or board contains the following provisions:

> "Any work or process incidental to, and carried on by a member at his plant as a part of the manufacture of any product of the Industry, shall be regarded as a part of the Industry."

This provision is a complete defense for any member of the Paper Industries against any action which may be taken against him by the Graphic Arts Code Authority based on his incidental use of a graphic arts process in the manufacture of his product. To be successful in their efforts the Graphic Arts Industry must procure the elimination of this provision from every Paper Code. It is the contention of the Paper Industries that this clause cannot be legally eliminated from their Codes without their consent. They propose to stand firmly on this ground in the present contest.

As Deputy Administrator in charge of the Paper Codes I received demands that there should be included in each such Code a clause to the effect that the use of all graphic arts processes should be subject to the Graphic Arts Code. The Labor Advisory Board also adopted the policy of making the inclusion of this clause a condition to their full approval of the Code. In each of my reports to the Administrator I stated that this was an attempt to impose a horizontal labor code on top of a vertical industry code and that the result of so doing would be to create endless confusion. In each case I was sustained by the Administrator who approved the Code without the objectionable clause.

Having failed to impose their will on the Paper Industries by this direct method the representatives of the Graphic Arts Industry attempted to accomplish the same result by an indirect method. They provided in their Code that the Graphic Arts Industry should include all operations of a graphic arts character, no matter where, by whom or for what purpose performed. This was something new and unprecedented in the NRA. Up to that time an industry had been conceived to be the manufacture of the commodity for which the industry was named. No one had ever thought of an industry as covering operations or processes wherever used. No one had conceived the idea that one step in the course of the manufacture of a single commodity could be separated out and declared to, not a part of the industry which produced such commodity, but a part of another industry. Neither did anyone have the idea that the manufacture of a single article might be subject to two codes, or, expressed in another way, that a part of one industry might be found in the vitals of another. It would be just as sensible to say that whenever an automobile manufacturer turned a shaft on a lathe he was engaged in the turning industry and not in the automobile industry.

The position of the Graphic Arts Code Authority has been attacked on very sound legal grounds. The only power to approve codes is found in the National Industrial Recovery Act. This Act authorized the President to approve codes for "Trades and Industries or subdivisions thereof." What did Congress mean by an "Industry"? Obviously the word was used in its ordinary, accepted sense. There can be no doubt that in everyday language an industry is the manufacture and merchandising of a certain commodity and includes all processes and operations necessary to the production of that commodity in the form in which it is ordinarily merchandised. If Congress had intended to classify Codes by processes or crafts, language appropriate to express that intention would have been used.

The only power granted by the Act is to approve codes for recognized industries. No power is granted to enlarge an industry by code definition and particularly when the enlargement is accomplished by lifting out and transferring pieces of other recognized industries.

Prior to the passage of the Act the term "Graphic Arts Industry" was commonly used to describe the commercial production of printed matter as a commodity and its sale as such. It never included printing done in a paper plant as an incidental part of the manufacture of a paper product. This was an equally well recognized part of the Paper Industries. The attemot to transfer such incidental printing to the Graphic Arts Industry by code definition is unauthorized and void.

The code definition of the Graphic Arts Industry is vulnerable on another and equally strong ground. The Act authorized the approval of a code for an industry only when the applicant association was "truly representative of the Industry." The Graphic Arts association, which presented the Graphic Arts Code, is not in the least representative of manufacturers of paper and paper products. Consequently no authority existed to approve a code which by its terms was intended to cover the operations of such manufacturers.

Eventually either in the NRA or in the courts, there must be a judicial determination of the validity of the code definition of the Graphic Arts Industry. The effect of a ruling sustaining the position taken by the Graphic Arts Code Authority would be far reaching and unpredictable. The Paper Industries and the Graphic Arts In-

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dustry have always been distinct and independent. Each has developed a wage and hour structure suitable to its own conditions. Each such structure rests on a certain base minimum wage. Wages above such minimum are dependent on the comparative skill of the workers. In the Paper Industries the test is the skill of the worker as compared with that of all other workers in a plant without regard to the particular process or operation on which any worker may be engaged.

If the demands of the Graphic Arts Industry are met the Graphic Arts wage scale will be applied to a few workers in each paper plant without regard to their skill as compared with other workers in the same plant. This would break down the whole wage structure in that plant and in the Industry, and would necessitate an adjustment of all wages to the wages of the selected few. The ultimate effect would be to impose the wage rates prevailing in the Graphic Arts Industry on all plants in the Paper Industries which employ any graphic arts processes.

This would be in direct contravention of an often announced policy of the NRA, that established differentials in wage rates between individuals, groups of employees, zones and industries must be respected in all code making. Any other rule or policy would have been so destructive of the whole existing industrial structure as to make the NRA a failure from the start.

It is not difficult to see through the efforts of the Graphic Arts Industry and to see what is really back of it all. In organized labor circles there is constant discussion of the relative merits of the craft or horizontal union as compared with the industry or vertical union. Most of the older unions are organized on a craft basis. The labor unions in the Graphic Arts Industry are of the horizontal type and in no industry are the unions more dominant. Quite naturally their officers cling to the horizontal form. A change to vertical unions could do them no good. Consequently it is their constant effort to extend the horizontal union.

Collective bargaining, however, under Section 7 (a) of the Act, has, under the rulings of the National Labor Board, been conducted by employers with committees selected by, and representing *all* of the employees of a plant. If, however, the position of the Graphic Arts Industry is approved a small selected group in each Paper plant would be regarded as engaged in the Graphic Arts Industry and not in the Paper Industry, and they would be entitled to bargain collectively with their employer without regard to the other employees in the plant. One attempt has already been made to secure an order for an election of representatives for collective bargaining in a paper converting plant, such election to be participated in only by the employees in that plant who are engaged in graphic art processes.

Up to the present time the NRA has avoided taking any position on the question of the horizontal *versus* the vertical union. If, however, the Graphic Arts Industry can induce the NRA to accept the theory that its code follows graphic art processes and is not limited by the established lines of the Graphic Arts Industry, it will have put the NRA in the position of sponsoring the horizontal union plan. And that is exactly what the Graphic Arts Industry is after.

You all know how reluctant the NRA has been to enforce codes by legal proceedings unless it was very sure of its ground. In fact it has seemed sometimes that the NRA would not move until assured by its legal staff that it has something more than firm ground under its feet. It insisted on reinforced concrete on bed rock. If, however, the NRA attempts by a legal fiction to extend the Graphic Arts Code into the Paper Industries, it will have assumed a herculean task in code enforcement. The Paper Industries realize fully just what such action will mean to them and they are not disposed to accept any such ruling from the NRA as final. Each individual case will be fought through the courts until a final determination has been reached. Furthermore, individuals who are made the subject of attack will not be left to fend for themselves; in each such case not only his own industry but the entire group of Paper Industries will join in the defense of the individual attacked. The difficulties of enforcing a law enacted without the consent of those intended to be governed by it or even in the fact of the determined opposition of a substantial minority of the governed are too well recognized to need discussion.

The NRA has announced a series of forty hearings at which evidence is to be taken in realtion to the conflicts between the Graphic Arts Code and the Codes of forty other industries, twenty-nine of which are in the Paper group. Each such industry will be heard separately and it is to be assumed that the hearings will result in forty separate orders intended to adjust or compromise the differences between the codes of the other industries and the Graphic Arts Code. These hearings will require the attendance of a great many busy people and the cost in money will run to a substantial figure. The hearings can result in nothing but a waste of time and money because the Paper Industries, at least, cannot afford to recognize any order which puts them or any of them in whole or in part under the Graphic Arts Code. Until the major question has been decided, discussion of subsidiary questions is futile. There is no room here for compromise. Any concession made by the Paper Industries would be a surrender of the principle that the Paper Industries are governed by the Paper Codes and the Paper Codes only.

A brief has been submitted to the National Industrial Recovery Board in behalf of the entire group of Paper Industries in which the arguments against the legality of the definition of the Graphic Arts Industry are developed much more fully than has been possible in this letter. It is hoped that the Board will be convinced that an order should be made definitely excluding the Graphic Arts Code from the Paper field, or, in the event that there is any delay in determining that question, postponing these hearings until the major question has been decided.

Whiting-Plover Elect Officers

At the annual meeting of Whiting-Plover Paper Company, on February 5, 1935, J. H. Miller was elected to the office of treasurer. E. A. Oberweiser, president, had formerly held both positions.

Mr. Miller's promotion marks the end of 25 years of service with Whiting-Plover, interrupted only by military service during the war. He began as a stenographer with the company in 1910, and in the intervening years rose steadily to the position of manager, which he has held for the past several years, and which he will continue to fill concurrently with the treasurer's place.

Possessed of a keen, analytical mind, Mr. Miller's forte is the actual manufacture of writing papers, but his interest and authority extends over merchandising as well. He was in charge of advertising during the period when Whiting-Plover began its development of mill brand papers, relinquishing that activity only with the formation of a department to take over that work.

The other officers of the company remain the same: President, E. A. Oberweiser; vice-president, F. B. Whiting; secretary, George Hilton.

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The machine, which is completely assembled with stuff-box and fully ready for installation, consists of a helical ribbon agitator revolving at 50 r.p.m. in the stock. The geared-head motor is direct connected to the agitator shaft and is carried in a vertical position as shown. The motor base is maintained in position by two parallel arms which allow the entire driving unit and agitator to move a short distance up or down under the influence of agitator thrust. The entire weight of motor, motor base and agitator are sensitively balanced by a balancing lever and weights. Density adjustment is obtained by applying weights as needed. In operation, an increase in density causes greater upward thrust on the agitator, thus causing the moveable parts to move upward. A decrease in density allows the mechanism to lower. Thus, the controller most certainly and sensitively floats in a bouyant manner in the stock to be conditioned.

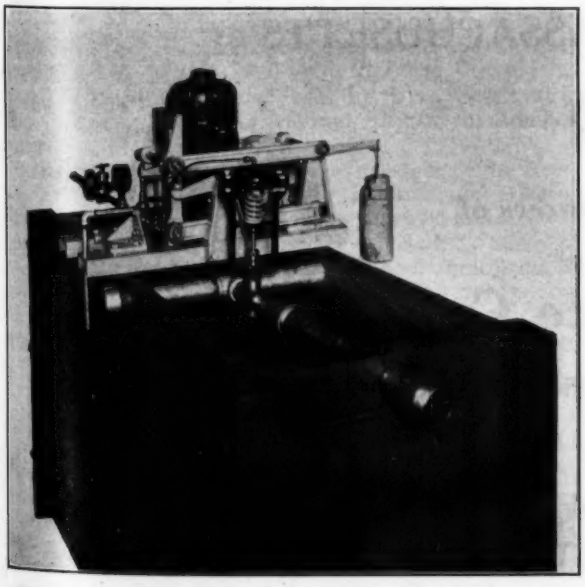
In the interest of maximum sensitivity, it is important that the density responsive elements of the machine be not called upon to directly operate the main dilution valve with its necessary pressure unbalance, stuffing box friction, etc. The Meyers Controller is therefore arranged to handle a small hydraulic pilot valve which, in turn, governs the movement of the main dilution valve. For this purpose a small amount of clear water at about 25 pounds pressure is admitted to the pilot valve under control of a reducing valve. Increasing density moved the pilot toward closure and increases pressure upon the diaphragm of the main valve to open it. Decreasing density has the opposite effect.

One point of unusual interest lies in the fact that entrance of regulating water to the stock is actually visible because it pours into the moving stock from a perforated pipe above stock level in the box.

The simplicity of design and consequent manufacturing economies together with full standardization of parts, allows the establishment of sound performance and quality guarantees, reliable delivery dates, reasonable selling price and highly dependable operation.

The company guarantees operating accuracy of the controller and is prepared to furnish this equipment for handling any amount or sort of stock at any density between 2 and 6.5 percent, and under any operating condition within its range.

The office of the company is at 1707 Main street, Buffalo, N. Y.



IMPROVED CONSISTENCY CONTROLLER

Waste Material Open Forum Arranged

The National Association of Waste Material Dealers, Inc., at its 22nd Annual Convention to be held in Chicago March 18 to 20 will devote one of its sessions to an open forum on important questions in reference to the present code for the waste material trade.

While the definite questions upon which discussion will be permitted will not be announced until the provisions to be contained in any new NRA Act are more definitely known, it is more than likely, that if trade and industry under the new Act are given the right to choose in reference to operating under a code or not, that one of the foremost questions that will be considered is—shall the code be extended?

Much discussion may also center around another question which has been raised considerably of late in the trade, namely shall the Administration be requested to entirely handle enforcement covering labor provisions of the code.

The question of new budgets for the present year for each of the respective code authorities will also be a matter of much interest and concern to those who have borne the burden thus far in that direction.

The National Association of Waste Material Dealers, Inc., is making it clear that members of the trade, irrespective of membership in any association, are to be given an opportunity to bring to this open forum their sincere and honest opinions on what has become a very important question, namely: can the code be an instrument through which to remedy cut-throat competitive conditions which have long been the bane of many in the trade?

The Convention Committee, in announcing this open forum, desires to stress the importance of members making application in advance for time to be heard. All statements will necessarily have to be brief, whether written or oral. The object of the forum is not to promote oratory but to secure as near as possible a virtual roll call of the country by sections, in order that the association may play its part in crystallizing opinion as to future policies if the trade is to continue under a code. In this connection, the National Association is firmly determined to lead and not follow during the coming years, in pointing the way to those things that are in reality best for the trade, whether they be policies affecting the code or along other lines.

Members of the trade are urged to attend this important forum and come prepared to talk within a reasonable time limit and only on definite questions which will be before the meeting.

South Bend Paper Mills Incorporate

Articles of incorporation have been filed with the Indiana Secretary of State here by the South Bend Paper Mill, Inc., 402 East Madison street, South Bend, Ind., formed to manufacture paper and paper materials. The corporation has 1,200 shares of capital stock, listing no declared par value and the incorporators are Charles H. Vihon, 237 North Michigan Street, South Bend, resident agent, Francis Jones and Robert E. BonDurant.

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Awards for Government Paper

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., February 20, 1935—The Government Printing Office has announced the following paper awards:

The Mathers-Lamm Paper Company will furnish 36,000 pounds (21,600 sheets) of No. 1 quality hard rolled binders board at 3.45 cents per pound. J. F. Post will furnish 36,000 pounds (360,000 sheets) of 25 x 38 antique book paper at 5.25 cents per pound. Bids for these items were received on February 4.

Dobler & Mudge will furnish 125,000 sheets of 22½ x 28½ white cardboard for NRA posters at $19.70 per M sheets, bids for which were received on February 1.

The R. P. Andrews Paper Company will furnish 12,500 pounds (100,000 sheets) of 20 x 25, 50 per cent rag cream white laid cover paper at 13.09 cents per pound, bids for which were received on January 30.

The Printing Office received the following bids for 5,250 sheets of brown ripple cover paper: R. P. Andrews Paper Company, at $37.50 per M sheets; Mathers-Lamm Paper Company, $37.50, and Virginia Paper Company, $39.47.

Barton, Duer & Koch Paper Company bid 7.75 cents per pound for 30,000 pounds of calendered tag board, the only bid received. The same firm will furnish 30,000 pounds of calendered tag board in 23¼ inch rolls at 7.75 cents per pound, bids for which were received on February 8.

Recommend Compensatory Tax on Sisal Kraft

Establishment of a compensatory tax of 22 cents per thousand yards, one inch wide, on sisal kraft tape to equalize the 4.2 cents per pound processing tax on cotton has been jointly recommended to the Agricultural Adjustment Administration by representatives of gummed cotton tape and sisal kraft tape manufacturers.

The recommendations which were taken under advisement, were made at a hearing called by Secretary of Agriculture Henry A. Wallace to determine whether the processing tax upon cotton is causing or will cause to the cotton processors disadvantages in competition from reinforced gummed paper tape by reason of excessive shifts in consumption between such commodities or products. The hearing, held in the Old Land Office Building, 7th and F. Streets, N.W., was presided over by J. L. Peirce and Percy C. Young, of the Agricultural Adjustment Administration.

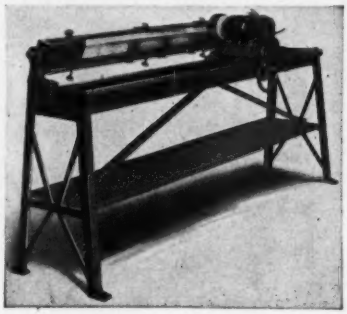
Charles K. Everett, of New York, manager of the New Uses Section of the Cotton Textile Institute, and Allison L. Newton, representing the Nashua Gummed and Coated Paper Company, the Brown-Bridge Mills, Inc., and the American Reinforced Paper Company, both agreed that a compensating tax of 22 cents per thousand yards, one inch wide, on sisal kraft, would be "fair for all practical purposes" in view of the 4.2 cents a pound processing tax on cotton.

Scientific Batch Mixer

The C. O. Bartlett and Snow Company, 6200 Harvard Avenue, Cleveland, Ohio, is offering the Lancaster mixer, a machine that is said to bring scientific principles of the batch mixing of glass, foundry sand, abrasives, refractories, clays, putty, asphalts, enamels, various pharmaceuticals and other mixes of dry or plastic consistency.

New Rogers Junior Model Knife Grinder

A new Rogers Junior Model paper knife grinder is just being placed on the market by Samuel C. Rogers and Co., 191-205. Dutton avenue, Buffalo, N. Y. This is represented in the accompanying illustration. The knife grinder is made in three sizes, up to 61 inches, 76 inches and 84 inches long.



The knife is quickly and easily placed on the knife bar, cutting edge up. The carriage with grinder wheel and motor is mechanically traversed by wheel, cut steel rack and pinion, insuring steady, smooth grinding. Cross feeding is effected by a small hand wheel on a screw for moving motor base which is gibbed to lower part of the carriage.

The bed is a heavy one piece casting with two parallel planed V bearings for carriage traverse, knife bar supports, steel cut rack, and is mounted on two cast iron standards well bolted, and braced to make the machine firm and rigid. Carriage for motor and grinding wheel is made up of bearing base, traverse wheel and pinion cross feeding slide with adjustable steel gib steel motor plate, swiveled for straight or concave bevel grinding. All are accurately machined to fit.

The knife bar is a heavy reenforced one piece casting with a cooling liquid reservoir; supported by two end brackets and fitted with knife set-up gauges and clamps for easily and quickly placing and holding the knife for grinding and is easily turned to and locked in position for grinding any degree flat or concave bevels on knives.

The new knife grinder is equipped with a 6-inch diameter free cutting cup grinding wheel of suitable grade and grain mounted on a motor shaft, and covered by a guard adjustable to the wear of the wheel. A ball bearing 1/3 hp. motor (1750 r.p.m) of any voltage or frequency is provided. An overload protection switch with cord, and plug for lamp socket connection is supplied.

Every machine is properly equipped for work with grinding wheel, motor, switch, cord and plug, and emery dresser and each grinder is carefully tested before being packed for shipment.

Japan Increases Paper Production

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., February 18, 1935—Production of foreign style paper by members of the Japanese paper manufacturers' association during the month of October amounted to 69,634 short tons, an increase of 1,881 tons over the preceding month, according to a report from the office of the American Commercial Attache, Tokyo. Total production for the first ten months of the year aggregated 655,562 tons, a gain of 64,018 tons over the corresponding period in 1933. Sales of foreign style papers, however, have been falling steadily since August, October's amounting to only 64,584 tons, a decline of 1,709 tons from the preceding month, and the lowest since the preceding March.

Sales for the ten months period, however, came to 652,763 tons, an increase of 61,425 tons, or 10 per cent over the corresponding period in 1933.

A SERVICE TO THE TRADE THAT WAS ESTABLISHED IN 1855

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1855 — A SERVICE OF EIGHTY YEARS — 1935

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Papers of High Quality

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41 Park Row

CONSTRUCTION NEWS

A Summary of Vital Facts Regarding Construction, Finances and Operation of Paper Mills

Construction News

Elizabeth, N. J.—The Wilson-Jones Company, South Elmora avenue, manufacturer of commercial paper specialties, loose-leaf forms, etc., has plans under way for a new one-story addition to paper converting plant, estimated to cost over $150,000, with equipment. Portion of the new unit will be used for distribution and shipping departments, as well as offices, now located in New York. Proposed to let general contracts for structure during March. Frederick Bevans is superintendent at local plant.

Troy, Ohio—The Gummed Products Company, manufacturers of gummed paper tape and kindred paper goods, has awarded general contract to the Gillmore-Carmichael-Olson Company, Euclid Building, Cleveland, Ohio, for new addition to plant, recently referred to in these columns, and work on superstructure will be placed under way at early date. New unit will be one-story, totaling about 50,000 square feet of floor space, designed for expansion in manufacturing divisions; same contractor will also build a new one-story power plant for service at the mill. Entire project will be pushed to completion in the spring, and is estimated to cost in excess of $200,000, with equipment. John H. Deeken, Times-Star Building, Cincinnati, Ohio, is architect.

Bridgetown, N. S.—The Annapolis Basin Pulp and Power Company, Bridgetown, K. L. Crowell, general manager, has plans under way for new local pulp mill, consisting of several units, reported to cost over $100,000, with machinery. Project will include an electric power development at Paradise Lake, for power service at the new plant.

Houston, Tex.—The Southern Container Company, 6037 Esperson street, manufacturer of corrugated paper boxes and containers, etc., is considering an expansion and improvement program at plant, including new extension and installation of equipment for increased production. Entire project is reported to cost over $60,000, including machinery.

New York, N. Y.—The Hudson Paper Box Corporation, recently organized with capital of $10,000, plans operation of local plant for manufacture of paper boxes and cartons. Incorporators of new company include George Gelbwaks and Jacob J. Schulder, 51 Chambers street, New York.

Marion, Ind.—The Container Corporation of America, 111 West Washington street, Chicago, Ill., manufacturer of corrugated and other paper boxes and containers, has concluded arrangements for purchase of plant and property of the Marion Paper Company, Marion, specializing in the production of container liners, box board and kindred paper stocks. A reported consideration of $180,000 was given for property. The plant has been inactive for a number of months, following an explosion that wrecked the power house. The mill has a rated capacity of about 50 tons of box board daily. New owner is said to be planning improvements in plant, including rebuilding of power house, and will occupy for new branch mill for raw material supply for various container-manufacturing units.

North Adams, Mass.—The Mohawk Paper Board Company, recently organized with capital of 200 shares of stock, no par value, plans early operation of a local mill for the manufacture of paperboard products, including counter board and innersole board for shoe production, binders, button board and allied specialties. New company is headed by Bernard F. Collins, president, and Irene E. Cummings, 102 Liberty avenue, North Adams, treasurer.

Philadelphia, Pa.—The American Paper Products, Inc., 2113 East Rush street, has acquired property adjoining plant at 2119-21 East Rush street, 42 x 73 feet, improved with a shop building, and will use for future expansion.

Brooklyn, N. Y.—The Midtown Manufacturing Corporation, recently organized, plans early operation of new local paper converting plant for manufacture of labels, tags and kindred paper specialties. Incorporators of the new company include Irving Ruina, 1840 Eighty-first street, and Milton Sarner, 1829 East Sixteenth street, both Brooklyn.

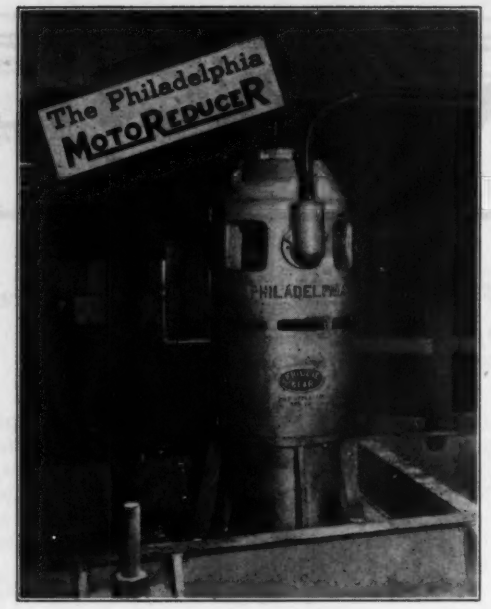
Leningrad, Russia—The Paper Trust, Soviet Russian Government, Moscow, Russia, is carrying out an expansion and improvement program at Volodarsk Paper Mill, Leningrad. A new paper-making machine has been built and installed in connection with the mill development, with rated capacity of about 16 tons of paper daily. Complete accessory equipment will be installed. Entire project will represent investment in excess of $200,000.

New Companies

New York, N. Y.—The Sanitary Paper Supplies Corporation has been incorporated with capital of $20,000, to manufacture and deal in paper products of various kinds. The incorporators include Martin J. Norris, 280 Madison avenue, New York.

Chicago, Ill.—The Morgan Rag and Paper Company, 2039 South Morgan street, has been organized with capital of 60 shares of stock, no par value, to deal in waste paper products. The incorporators are Joseph and Louis Kosh.

New York, N. Y.—The A-One Paper Tube Corporation has been incorporated with capital of 200 shares of stock, no par value, to manufacture and deal in paper tubes, paper boxes and kindred products. New company is represented by M. Howard Leibowitz, 245 Broadway, New York, attorney.

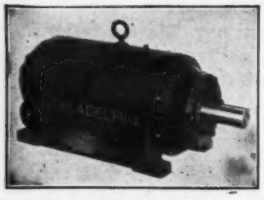


—driving a Pulp Mixer

One of the many applications in the Pulp and Paper Field

The Philadelphia MotoReduceR is the modern single-unit drive, combining in one housing both motor and speed reducer. Built in both horizontal and vertical types, its adaptability is practically limitless. In the paper industry it is a most economical and efficient means of driving agitators, conveyors, elevators, pumps, etc.

The MotoReduceR possesses great strength and rigidity and operates with a minimum of noise and vibration, yet is so compactly constructed that it takes up very little floor space. Being in one unit, it requires no separate base plate and can be installed quickly and economically. Would you like a copy of the new MotoReduceR catalog which gives the complete story?



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Where a separate speed reducer is required, remember, Philadelphia makes them in all types and sizes and can supply the one which will best fill your needs.

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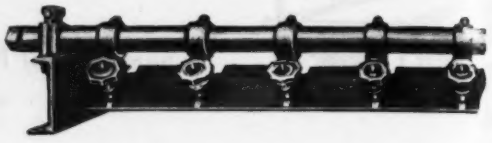
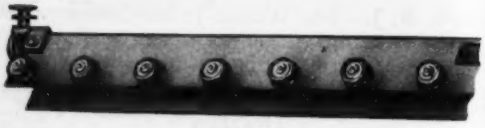


Adjustable Deckle—removable blade.



Fixed Deckle—for low head.

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Controls thickness and weight of sheet across machine.

Prevents slime spots and lumps gathering.

Results in more even pressing and drying. Minimizes breaks.

Produces a smooth roll to calender and winder.

Flexible blade, adjustable at various points.

Easily attached to Fourdrinier machine.

Can be used as 1st, 2nd, or 3rd slices for all weight papers.

Made in fixed or adjustable deckle for high or low heads.

Thirty successful installations. Further particulars on request.

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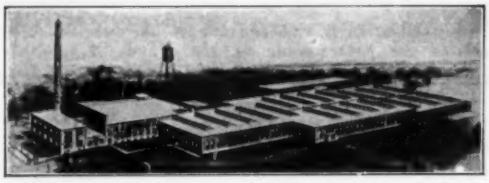

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THE YEAR IN PAPER

Following the usual custom, a thorough analysis of the paper industry in North America for the past year is afforded in the Annual Review Section of this Convention Number of the PAPER TRADE JOURNAL. Different divisions of the industry have been concisely reviewed by representative leaders of the industry in their particular fields and the information derived therefrom may be depended upon to be thoroughly accurate and trustworthy in every respect.

Paper production during 1934 amounted to 8,500,000 tons, a decrease of 690,017 tons, compared with the output for 1933. This may be regarded as a favorable sign, as over-production had been the bane of the paper industry for some years past, and now that manufacturing operations are practically keyed to consumption, the statistical position of the industry is strengthened.

The reason that paper did not keep abreast of the production trend in 1934 is partly explained by the tremendous increase in paper production that took place in 1933, during which huge stocks, many of a speculative nature, were accumulated, according to a bulletin issued by the American Paper and Pulp Association. The upward trend of the general production index and the level trend of the paper index indicate plainly that accumulated stocks were being consumed.

There was a remarkable increase in the production of newsprint paper in 1934. The total output in North America, according to the News Print Service Bureau, amounted to 3,892,887 tons, of which 2,599,292 tons were made in Canada, 957,196 tons in the United States, 316,119 tons in Newfoundland, and 20,280 tons in Mexico. The Canadian output was 28.9 per cent higher than in 1933, that in the United States 1.1 per cent more, with a gain of 16.7 per cent in Newfoundland and 23.9 per cent in Mexico, making a total continental increase of 642,570 tons, or 19.8 per cent. Stocks of newsprint paper at Canadian mills totalled 30,366 tons, at United States mills, 12,428 tons, making a combined total of 42,794 tons at the end of the year, compared with 58,261 tons on December 31, 1933. Faced with increasing costs, efforts were made to come to an agreement as to reasonable prices although the outcome so far has been disappointing.

The bright particular feature of the year in the fine paper industry was the fact that the excess stock situation, both on regular lines and job lots in the general market, has been very well cleared up. Writing paper production averaged 61 per cent of normal and shipments averaged 60 per cent of normal, representing 16 per cent decrease respectively over the 1933 average. Cover paper production during 1934 averaged 52 per cent of normal and shipments averaged 50 per cent of normal, representing 24 per cent and 28 per cent increases respectively over the 1933 average. Incidentally, the rate of operation for the writing paper mills was above the rate of production in the iron and steel, cement and construction industries but was closely in line with the rate of operations in consuming industries to which the fine paper industry is definitely related.

While the book paper industry continued to be affected by the continuance of the depression and economic conditions that have been experienced for several years, some improvement was experienced, thanks to the operation of the Code. The filing of quotations has undoubtedly been the great stabilizer of the price structure, and has done away to a very large extent with the severe cut-throat demoralized condition that existed before the adoption of the Code. Prices continued steady throughout the year, although there has been no advance from the prices quoted in the first quarter of 1934. Actual production of book paper in tons during 1934 was slightly less than in 1933. No new paper machines were installed and the tonnage produced was approximately 1,200,000 tons.

Conditions in the kraft paper industry were decidedly better in 1934 because of the manner in which the industry adjusted its operations to meet what were very unsatisfactory economic conditions. The manufacturers of kraft paper quite sensibly adjusted their production to the current demand for their product and, as a result, the production of kraft, although on a low level throughout the year, was free from excessive peaks or excessive values. Stocks of kraft on hand at the mills did not vary more than one week's supply from the high point to the low point during the year. Everything considered, the price level was a fairly satisfactory one. Many manufacturers in the industry were enabled to show credit balances for the first time in recent years.

In the paper board industry the year 1934 was a period of readjustment during which operations under the labor provisions of the Paperboard Code and the effects of prices under the many codes governing raw materials and suppliers of all kinds from whom the mills make purchases, had to be assimilated. The low average activity required

that every economy in operation be practiced. Many paper board mills have been improving their equipment and processing to obtain greater efficiency and would have gone further had it not been for the high cost of making such changes. Steam and power equipment represent nearly one-third of the cost in board making. Developments in high pressure steam and turbo generators have made possible reduction in this large item cost, and this part of the equipment has been and is in the process of revamping in many mills.

It will be clearly seen by the reviews presented in this number that, under the Paper Industry Code, great progress has been made during the past year towards stability. The price structure is firmer and cut-throat competition has been eliminated. Stocks at the mills and in merchant's warehouses are below normal and already demand is more insistent than in the preceding year. Altogether, the outlook for the paper industry for 1935 is decidedly encouraging.

New Plan Offered to Price Bros. & Co.

[FROM OUR REGULAR CORRESPONDENT]

MONTREAL, Que., February 18, 1935—P. W. Pitt, representing British financiers, has in the last week brought forward a plan for reorganization of Price Bros. & Co., Ltd., newsprint manufacturers. The latest proposal, which has been outlined to the various groups interested in the company, differs from the previous proposals advanced for its rehabilitation in that the new money would be made available in return for a junior equity position.

Mr. Pitt made a statement today "to avoid rumors which might be misleading." In it he said:

"I have been authorized to submit an offer of reorganization accompanied by a deposit of $500,000 which is now available in a Montreal bank in my name.

"I discussed this offer at length with the bondholders' committee last Friday and they are constructively helping me by all means within their power to find a solution to certain points still unsettled between us. This offer is firm, as far as the bondholders are concerned, but my group are prepared to negotiate further on any points to which reasonable objection might be taken by any of the parties thereby affected.

"The offer is based upon my group's faith in the future of the newsprint industry in Canada and provides for the underwriters undertaking to put up without any commission $6,000,000, out of which amount $5,000,000 will go into the common stock of the reorganized company. Therefore, if their faith is misplaced, they will lose $5,000,000, but if the newly organized Price Brothers should prosper, they hope to make a handsome profit.

"The offer provides, among other things, for the existing preferred and common shareholders converting their holdings into common stock of the reorganized company on what we are confident they will consider a fair and equitable basis."

Weyerhaeuser To Build New Pulp Mill

The Pulp Division of the Weyerhaeuser Timber Company has started construction of an unbleached sulphite pulp mill at Everett, Wash. The new unit will have a daily capacity of 150 tons of high quality unbleached sulphite and is to be equipped with six 15-ton digesters. The product of the new mill will be available early in 1936.

Alabama Acts To Get Newsprint Plants

Press dispatches announce that following conferences with New York bankers, Governor Bibb Graves of Alabama announced that newsprint plants may be established in the South soon. The product would be cheaper than, but equally as good as that provided by Canadian mills, he said.

"I believe that financing for the project is assured," said Governor Graves. He did not reveal the identity of the bankers.

The industry in Alabama would be based on the processes recently developed by Dr. Charles S. Herty in the pulp and paper laboratory of the Industrial Committee of Savannah.

"Dr. Herty has convinced the scientific world that he can make good white paper out of ordinary slash pine, which grows very rapidly in Alabama," Governor Graves declared. "Alabama possesses large resources of this variety of pine.

"Instead of higher priced paper coming from Canada and giving employment to thousands of Canadians, we might pay lower prices for our newsprint and give employment to Americans. Cheaper newsprint would be of inestimable value to every newspaper published in America.

"I am convinced that we can produce newsprint more cheaply in Alabama than they can do it in Canada. Establishment of such an industry in our State would give employment to thousands of persons in our backwoods and bring large revenues to our State.

The first plant probably will be established on the Tom Bigbee River, where it will have water carrier facilities to all points on the navigable Mississippi and to ocean vessels from New Orleans."

January Newsprint Statistics

Production of newsprint in Canada, according to the Newsprint Service Bureau, during January 1935 amounted to 201,959 tons and shipments to 180,026 tons. Production in the United States was 80,666 tons and shipments 75,701 tons, making a total United States and Canadian newsprint production of 282,625 tons and shipments of 255,727 tons. During January, 28,012 tons of newsprint were made in Newfoundland and 2,066 tons in Mexico, so that the total North American production for the month amounted to 312,703 tons.

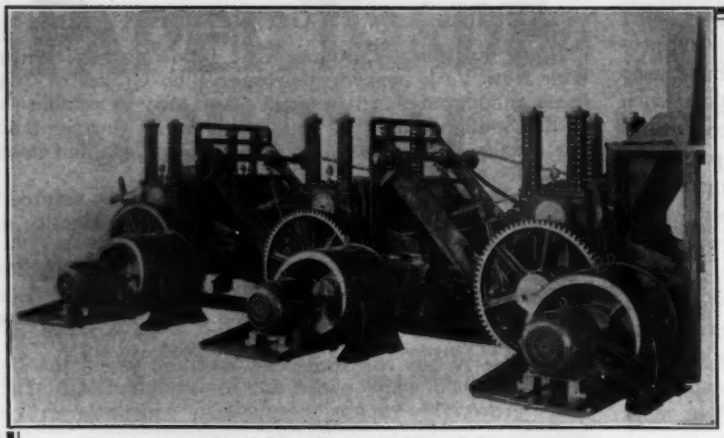
The Canadian mills produced 13,734 tons more in January 1935 than in Januray 1934, which was an increase of 7 per cent. The output in the United States was 2,515 tons or 3 per cent less than in January 1934, in Newfoundland 2,535 tons or 10 per cent more, and in Mexico 833 tons more, making a total increase of 14,587 tons, or 5 per cent above January 1934.

Stocks of newsprint paper at Canadian mills were reported at 51,932 tons at the end of January and at United States mills 17,277 tons, making a combined total of 69,209 tons compared with 42,311 tons on December 31.

Finds Old Paper Trade Journal

Jay H. Hollingsworth, president of the J. H. Hollingsworth Paper Co. Inc., Phoenix, N. Y. writes:

"In looking over some old papers of my father's a short time ago, I came across a copy of your PAPER TRADE JOURNAL dated June 16, 1877. In this was an article written by my grandfather entitled 'Hints to Young Machine Tenders.' This paper has preserved very well."



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They produce a fluffy well-aerated, evenly-divided fuel, with a low moisture content, ready for burning. The continuous process employed has been proven over a period of fifty years as being the most economical means of extracting liquid from fibrous materials.

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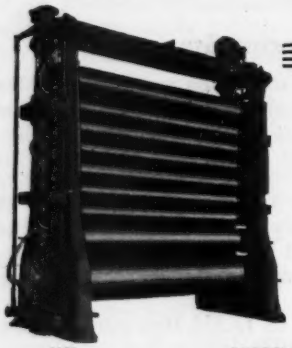
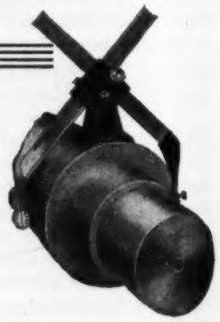


"Modernized equipment is the basis for profits"



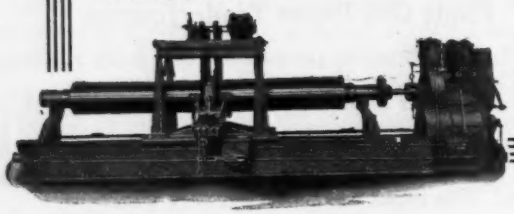
Many mills are finding these LOBDELL products to be profitable investments

LOBDELL CALENDER STACKS

are accurate, durable, easily operated machines. Rolls are of "Puraloy" (mentioned below) and stacks are equipped with floor controlled Lifting Device which may be operated by motor, ratchet or hydraulic cylinder. Modern, trouble-free lubrication is another feature of these widely used and endorsed Calender Stacks.

LOBDELL ROLL GRINDING MACHINE

designed primarily for grinding paper mill Rolls, is the most rapid and accurate machine obtainable for this purpose. Simplicity of design, rigidity of wheel mounting, the "exclusive" automatic crowning device, special provision for leveling the bed (to compensate for wear and foundation changes) and automatic lubrication—make this superior efficiency possible.



LOBDELL IMPROVED MICROMETER ROLL CALIPER

an indispensable instrument for all mills—either to keep a check on regrinding or on the condition of Calender and Press Rolls. Light in weight, easily adjustable and extremely accurate.

LOBDELL "PURALOY" CHILLED CALENDER ROLLS

assure maximum hardness and a perfect surface. They minimize pitting and wear and are therefore ideal for the very severe conditions of water finish papers. (An exclusive Lobdell product.)

LOBDELL
CAR WHEEL COMPANY
99 Years in Business
WILMINGTON·DELAWARE

Name It —and We Have It

There are all kinds of paper mills and all kinds of paper machines in them. There are all sorts of operating conditions and all sorts of felting needs.

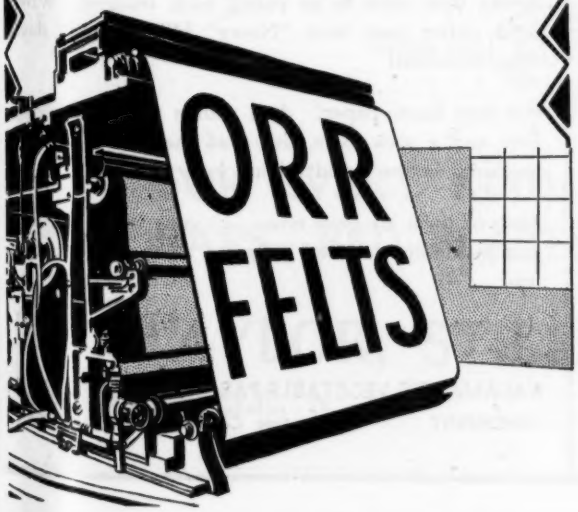
We weave fine felts with which to serve those many and varied felting requirements, and can send you a felt adapted to any condition you may describe.

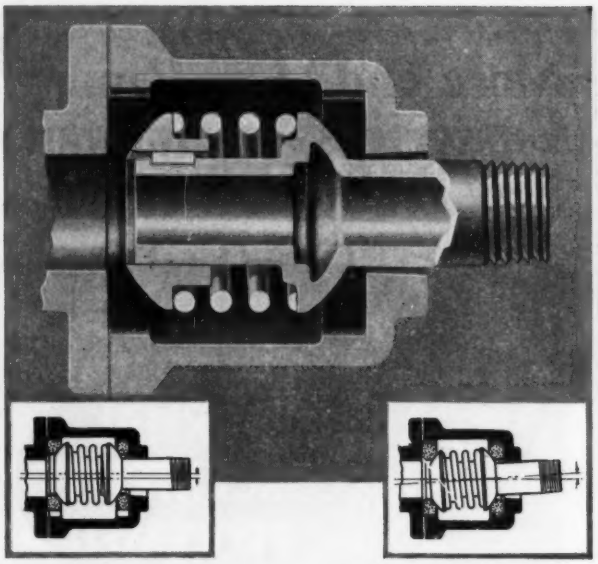
Nor are we ever hesitant about placing Orrs in competition with other felts to determine which leads in water removal qualities, or in ability to stand hard wear.

Send your next felt order to Piqua.

The Orr Felt & Blanket Co.

Piqua, Ohio





How long *Can a rotary joint last?*

The answer may not be known for years—for the simple reason that every Johnson Joint ever installed is still giving satisfactory service.

The illustration tells the whole story. Here is a pressure joint with only seven major parts that has no packing—requires no lubrication—no adjustment. Note the two sealrings of special carbon graphite which hold the pressure. The spring is only for initial seating. In service, sealing is accomplished by the pressure within the joint. Therefore the seal is automatically held as tight as the pressure requires. Also note the provision for lateral or parallel movement as diagrammed. This is a revolutionary combination of features that has much to do with the long, trouble-free, life of the joint.

We want you to know this joint as scores of plants already know it. Therefore we are making an unusual offer. We simply ask you to test one of these joints—then return it to us at our expense with a report on its performance. Do not confuse this with a so-called "free trial" which obligates you to keep the equipment if it proves satisfactory. Your only obligation in this case is to examine it, test it, and return it! Coupon, below, brings facts.

THE JOHNSON CORPORATION

814 Wood Street, Three Rivers, Michigan

Johnson

Rotary PRESSURE JOINT

TRY IT...THEN RETURN IT!

The Johnson Corporation, Three Rivers, Michigan
Your proposition of trying out a Johnson Pressure Joint as outlined above is of interest. Please send form on which I can indicate type and size desired. P-2

Individual .....

Company .....

Street and Number .....

City and State .....

More and More Paper Converters Are Finding New Profitable Uses For

LATEX

NORMAL
CONCENTRATED
PROCESSED

HEVEATEX HAS THE FORM SUITABLE FOR YOUR REQUIREMENTS!

The extensive Heveatex experience and facilities assures the buyer that the latex selected —Normal, Concentrated or Processed—will embody the important elements of constant uniformity and standardized quality, so necessary for continuous manufacturing operations.

COMPLETE STOCKS FOR IMMEDIATE SHIPMENT

RUBBER POWDER

Heveatex have developed rubber powders which may be obtained in any formulation suitable for numerous purposes, such as direct molding without the necessity of mastication, etc. Ask for particulars and samples of No. 58 for hard rubber molding, and No. 194-G, a substantially pure rubber powder.

HEVEATEX
CORPORATION

MAIN OFFICE:
78 GOODYEAR AVE.
MELROSE, MASS.

NEW YORK OFFICE:
90 BROAD STREET
NEW YORK CITY

Akron, Ohio Chicago, Ill. Detroit, Mich.

Uncle Jake Goes Back 50 Years . . .

. . . back to the days of

"Nosey" Hill
"Bill" Wentz
"Bob" Butler
McGinnis
Seymour
Flannery

. . . . and a score of others like them. Here today, gone tomorrow, drunk on Saturday night . . . . tramp papermakers. What a roistering, hard-bitten, hell-for-leather lot they were.

Those were the days when every real papermaker took professional pride in measuring up to these specifications:

He must—

(1) Cuss like a drunken sailor.
(2) Chew natural leaf tobacco.
(3) Drink rot-gut whiskey.
(4) Wear a greasy shirt.
(5) Be equally accurate with either foot on a back tender's posterior.
(6) Blame everything that went wrong on either the beater engineer, the millwright, or the back tender.

Well, these old timers not only lived the rules—they wrote them! Remember the stories of their incredible prowess—of the dozens of run-down mills they had put on their feet—of the general managerships they had turned down because the life was too soft—what heroes they were to us young back tenders! Why, we'd rather have been "Nosey" Hill in those days than President!

But they knew paper! And with a wire or a string here and a stick there, they had the crankiest paper machines in the world talking baby talk.

Most of them are gone now . . . . gone the way of the tramp printer . . . . and golly . . . . somehow, we miss 'em!

Uncle Jake

KALAMAZOO VEGETABLE PARCHMENT COMPANY
PARCHMENT (Kalamazoo County) MICHIGAN

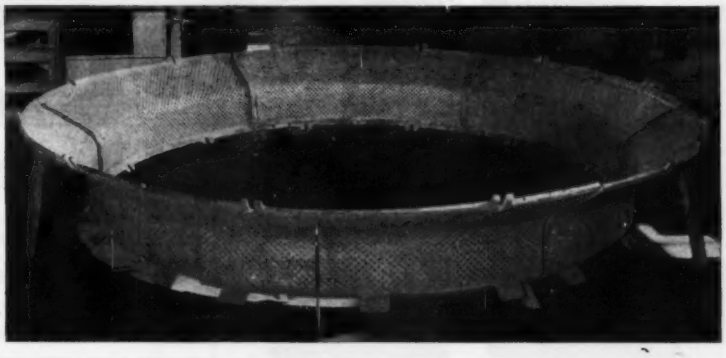
MISCO "C"

THE CORROSION RESISTANT ALLOY

is proof against corrosion by sulphite acids

Nearly seven years ago the first MISCO "C" castings were installed in a sulphite digester. These castings and thousands of other MISCO "C" castings produced since that time are still in service, unaffected in any way by the corrosive agents with which they have been in daily contact. Specify MISCO "C"—to be sure.

Prospective users are invited to make use of our research facilities and to draw upon our experience covering 15 years as one of the world's pioneer producers of heat and corrosion resisting alloys.

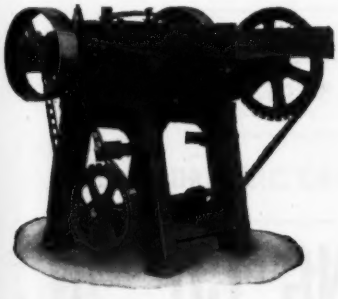


15 ft. diameter Misco "C" strainer designed and produced for an eastern sulphite mill. The holes are cored by an exclusive process used only by the makers of Misco "C".

MICHIGAN STEEL CASTING COMPANY

One of the World's Pioneer Producers of Chromium-Nickel Alloys

1990 GUOIN STREET, DETROIT, MICHIGAN



RAG CUTTERS

Under the TAYLOR, STILES & COMPANY GIANT REG. U.S. PAT. OFF. RIEGELSVILLE, N.J. U.S.A. Trade Mark

FOR EVERY KIND OF PAPER STOCK
ROLL BARS—BED PLATES—RAG CUTTER KNIVES

TAYLOR, STILES & COMPANY

RIEGELSVILLE, N. J. **U. S. A.**

GOOD PULLEYS

75 years ago—today, and tomorrow

WOOD'S CAST IRON PULLEYS

WOOD'S PRODUCTS

Shafting, Hangers, Collars, Pulleys, Friction Clutches, Ball Bearings, Flexible Couplings, Rope Sheaves, Pillow Blocks, Belt Contactors, "V" Belts, "V" Belt Sheaves and complete "V" Belt Drives.

Throughout the entire Paper Industry there are thousands of Wood's Cast Iron Pulleys in use—staunch, accurate Pulleys of most every conceivable size—Pulleys which are just as good today as they were when installed.

The above also applies to other Wood Equipment, such as Hangers, Belt Contactors, Rope Drives, Couplings, Pillow Blocks, etc.

For nearly 80 years WOOD'S have built only one type of products—QUALITY PRODUCTS—and that is why the phrase "ONCE A WOOD'S USER, ALWAYS A WOOD'S USER" is so common in Power Transmission circles.

Send for literature on any (or all) of our products listed.

T. B. Wood's Sons Co.

Chambersburg, Pa.

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30 CHURCH ST.

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MEMBER — THE MECHANICAL POWER ENGINEERING ASSOCIATES

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PAPER MAKERS IMPORTING CO., INC.

COATING FILLING

Economy of Operation

Modern equipment contributes materially to "Economy of Operation" — the current watchword of manufacturers everywhere. Is *your* plant thoroughly up-to-date? Do you need engineering counsel on any problem? Our technical staff is at your service to help you solve it.

We manufacture a wide range of equipment such as

THE GREAT NORTHERN GRINDER

U. S. Patent No. 1757031

The latest achievement in the field of mechanical pulp manufacture. Simple and rugged in construction, low in first cost, and economical to maintain. Space occupied is less than for any other type of modern grinder.

HYPOID GEAR DRIVE STANDS

ANTI-FRICTION BEARING APPLICATIONS

THE MONTAGUE SCREEN

INTERNATIONAL CORE-SPLICING MACHINE

CURTIS HYDRAULIC GRINDER LATHE

AUTOMATIC WHITE WATER SAMPLER

AUTOMATIC WATER JET

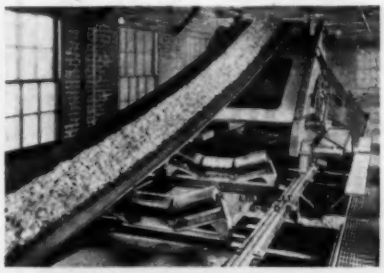
SPECIAL MACHINERY

Special machinery built to your designs.

MONTAGUE MACHINE COMPANY
Turners Falls, Mass.

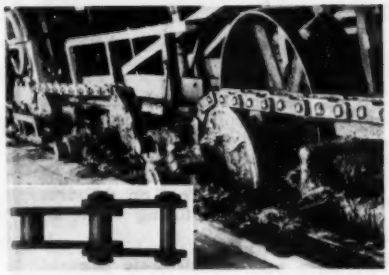
Cut costs in 1935 *with* LINK-BELT CONVEYORS *and* POSITIVE DRIVES

Install cost-reducing conveyors, positive drives—modern handling and power transmitting equipment—in order to produce your high grade product at low cost, and at the same time retain control of profits. Meeting today's and tomorrow's requirements necessitates the closest attention to the task of scaling down production costs.



Belt Conveyor handling Chips.

Slasher Conveyor Chain.



Steel Chains for barking drums.

Silverstreak Silent Chain Drive.

LINK-BELT PRODUCTS INCLUDE:

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LINK-BELT COMPANY 2211

The Leading Manufacturer of Equipment for Handling Materials and Transmitting Power

Chicago Philadelphia Indianapolis Atlanta San Francisco Toronto

Offices in Principal Cities

FLOOR PLATE

gives a Real Non-Slipping Surface

for Paper & Pulp Mill Walkways and Trucking Lanes

Neverslip Floor Plate in Trucking Aisles in Storeroom of a Nationally Known Coated Paper Mill

NEVERSLIP—the original Raised Diamond design of Floor Plate, is used in many mills for real protection against the slipping of human feet or truck wheels around Fourdriniers, Digesters, Beaters, Storage Racks, Finishing Machines, etc. In addition to its protection against slipping, **NEVERSLIP PLATE** saves wear on wooden, concrete or composition floors (thus reducing floor repairs and maintenance costs).

NEVERSLIP PLATES have been consistently used in all types of manufacturing plants for over 35 years, and because of their exclusive design, they give a non-slipping surface in every direction and allow unobstructed drainage and ease of cleaning.

Specify **NEVERSLIP PLATES** for Safety, Durability and Long Life.

Send for Literature . . . *Use this Coupon*

American Pressed Steel Co.
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Please send me your Literature, without obligation

Mr. .....Title.....

Firm Name .....

Address .....

BENNETT

TRADE MARK

ROSIN-WAX SIZE

HERE ARE THE FACTS

Again, for the eighth consecutive year, the consumption of Bennett Rosin-Wax Size has shown a substantial increase over the previous year.

Eighteen paper mills in the United States and Canada have installed Bennett Dispersion Machines for making size at their own plants. The combined production of these mills is 2,700 tons daily.

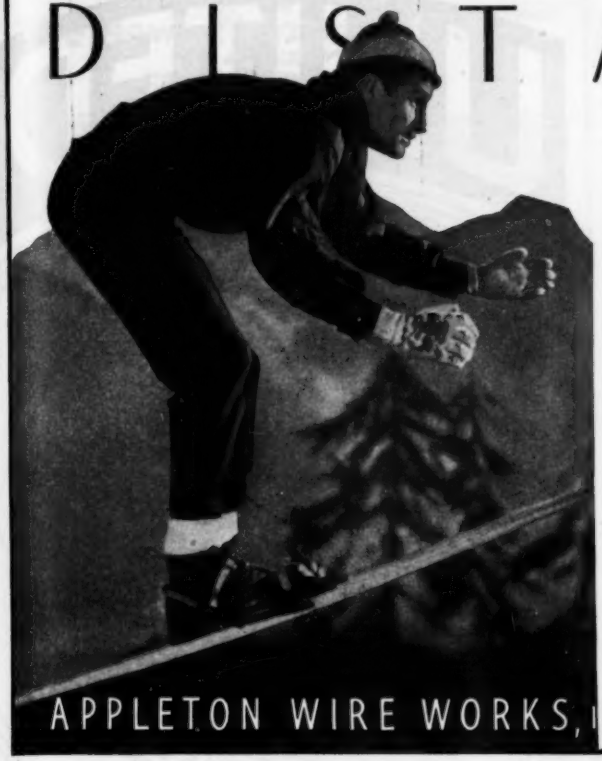
In addition, prepared Bennett Sizes are manufactured and shipped from three size plants conveniently located at Cambridge, Mass., Cincinnati, Ohio, and Chambly Canton, P. Q.

Over one million tons of paper will be sized with Bennett Rosin-Wax Size in 1935. If you are not already familiar with the improvements in quality and economies in cost obtained from Bennett Size, it will pay you to investigate without further delay.

BENNETT INCORPORATED

CAMBRIDGE, MASS., U. S. A.

DISTANCE



A ski jump of 278 feet has captured a world's championship. Appleton Phosaloy Wires with the App-Weld Seamless Joint, often travel over 8,000 miles when used at a machine rate of 1050 feet per minute. All this distance is made while driving machine rolls, carrying stock and pulling against the suction of the vacuum boxes. Great distance, in ski jumping or wire life, is attained only by painstaking preparation.

APP-WELD PATENTED SEAMLESS JOINT

APPLETON PHOSALOY WIRES

"Appleton WIRES are GOOD Wires"

APPLETON WIRE WORKS, INC., APPLETON, WISCONSIN

Good Business!

. . . providing every modern facility to build the best machines possible

That is the IMPCO policy! It has been fully justified by the continued confidence throughout the pulp and paper industry in IMPCO designing and workmanship that keeps pace with standards demanded by the mills. An example of IMPCO forethought is the careful engineering completed before installations are made to prevent later delay in achieving proper synchronization.

The IMPCO policy is good business for us—and it is bringing good business to us!

How can our engineers assist you? Information? Technical Data? Tests? Operating Data? Write us!

IMPROVED PAPER MACHINERY CORPORATION

IMPCO

Knotters
Low power consumption—gentle washing of knots.

Centrifugal Screens
Low power in proportion to pulp cleanliness demanded.

Flat Screens—DUNBAR DRIVE
No noise, no vibration, no lubrication waste. Minimum power, 1.25 H.P. for a 12 plate screen. Positive action.

Vacuum Filters
Positive vacuum control and positive discharge. All parts of machine easily accessible. Machined cylinders, precision bearings, compact drive.

Deckers
with outside bearings, rigid IMPCO moulds.

NASHUA, NEW HAMPSHIRE

A NEW SWW BED PLATE

FACE AND END VIEWS OF SIMONDS - DAYTON ABRASIVE - STEEL COMBINATION BED-PLATE
Pat. Applied For

Here is a new SWW development in bed plates—a plate for use on long fiber stock, of which kraft, wrapping, envelope and rag are typical. It does an excellent job of brushing and drawing of the fibers. Mills with this particular refining problem should inquire.

Also makers of all standard pattern bed plates, as well as the widely used open-center plate for hydrating and for increasing the stock travel—and the well known diamond-faced plate employed to hydrate stock with minimum fiber shortening in the brushing.

BEATER BARS

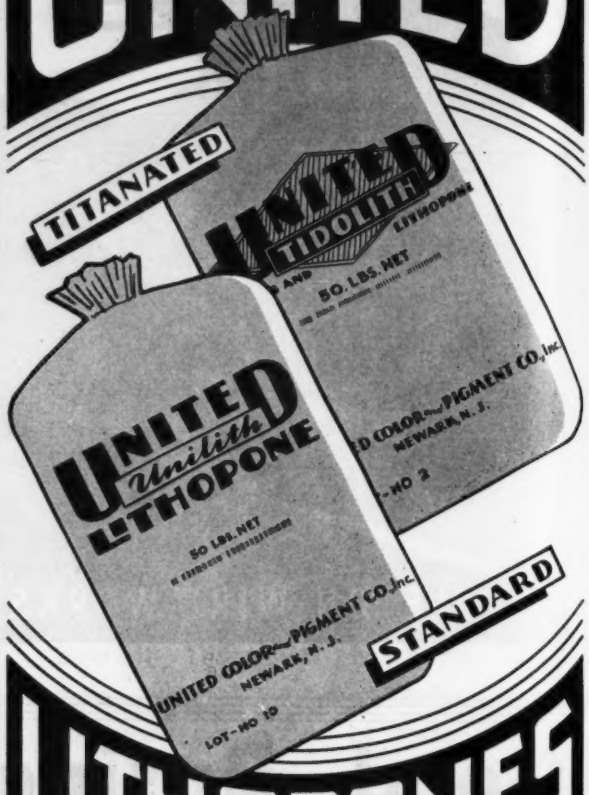
Beater bars forged to requirements out of carbon steels and alloy, bronze, stainless steel. Dowd staggered type—Simonds-Dayton Corrugated Type—Simonds-Dayton Vented Type—and all other standard sections.

Also Manufacturers of

Paper Trimming Knives, Rotary Cutter Knives, Wood Chipper Knives, Pulp Shredder Knives, Rag Cutter Knives, The Simonds-Dayton Roll Bar Grinder, Dayton Abrasive Wheels for Knife Grinding.

SIMONDS WORDEN WHITE CO.
Main Office
DAYTON, OHIO
Factories at DAYTON BUFFALO CLEVELAND BELOIT

UNITED



LITHOPONES

WHITEN **and** ***BRIGHTEN*** **your paper stocks—**

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IMPROVE **and** ***SHARPEN*** **printing qualities—**

●

MINIMIZE **yellowing, wear and ageing—**

●

INCREASE OPACITY **(eliminate "show-thru")**

● ● ●

UNITED LITHOPONES (Regular and Titanated) will definitely give your papers these desirable features *at a moderate cost!*

Write us direct—or to our nearest Branch Office (listed below)

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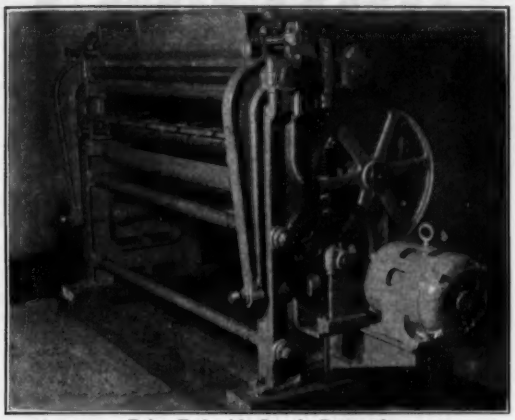
Main Office and Plant: NEWARK, N. J.

Sales Offices, Representatives and Warehouses in:

Boston	*Cincinnati*	*San Francisco*	*Indianapolis*
Pittsburgh	*Seattle*	*Cleveland*	*Baltimore*
Buffalo	*Philadelphia*	*Detroit*	*Milwaukee*
Chicago	*Los Angeles*	*Dallas*	

The New Francis Model "C" SHEET PASTER

EST. 1880.



Drive End with Guards Removed

Speed—Quality Work—Economy

Outstanding For

EASE AND POSITIVENESS OF ADJUSTMENT
COUNTERBALANCE AND CONTROL OF SPREAD
COMPACTNESS AND RIGIDITY OF CONSTRUCTION
TAKES VARIOUS THICKNESSES AUTOMATICALLY
ALL ROLLS OF METAL
SPRING STRIPPERS—NO WASTEFUL GROOVES

Write Us For Particulars

CHAS. E. FRANCIS COMPANY
RUSHVILLE, INDIANA

AMIJEL A AMIJEL

SPECIALLY PROCESSED

Beater Starch

Amijel is a pure starch so treated that it is able to absorb cold water to form a paste. Ordinary starch would have to be cooked to form a similar paste. This is why Amijel can be added to the beaters directly . . . in dry form.

Manufactured by

CORN PRODUCTS REFINING CO.
17 Battery Place New York City

AMIJEL NRA AMIJEL

Gatke

NON-METALLIC

Moulded Bearings

outwear bronze, resist chemical action, and fit without machining

For higher efficiency and lower operating cost, replace metal bearings and bushings in your mill with Gatke Non-Metallic Bearings. They outwear bronze ten to twenty times. They withstand high bearing pressures and are unaffected by ordinary acids, chemicals, solvents, or salt water. They are moulded under terrific pressure and take the place of metal bearings without mechanical changes. Reduce your maintenance expense and enjoy lower power consumption with these wonder bearings. Submit blueprints and dimensional data, and quotations will be cheerfully made. Address communications to:

GATKE CORPORATION
228 N. La Salle St., Chicago, Ill.
Manufacturers of Frictional and Anti-Frictional Products
Factories—Warsaw, Ind., and North Brookfield, Mass.

This NOPCO WAX SIZE

Clicks with Paper Makers

CHEMICALLY STABILIZED

Here are but a *few* of the reasons why Nopco Wax Size is becoming so popular with paper makers:

1. It is easily handled—requiring only a tank and a source of hot water for preparation.
2. It is a highly-efficient sizing agent.
3. It may be used with rosin or in place of rosin—depending on the properties desired.
4. It is economical.

A card will bring a Nopco technical man, or complete information regarding Nopco Wax Size.

NOPCO

NATIONAL OIL PRODUCTS CO.
Harrison, New Jersey
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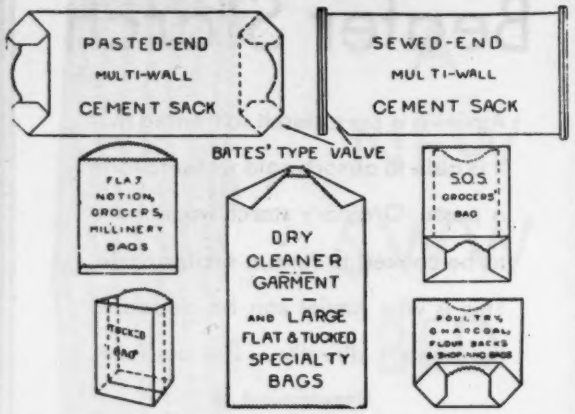
POTDEVIN

OVER 60 MODELS OF PAPER BAG

MACHINERY

FOR PLAIN OR PRINTED



ALSO MULTI-COLOR PRINTING PRESSES - COMPENSATORS - BOTTOMERS - GLUING - PASTING PAPER WAXING MACHINERY, ETC.

POTDEVIN MACHINE CO.

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BRILLIANT COLORS for CALENDER STAINING

Our new Shade Card No. 14-EX is now available, showing a large number of shades that can be obtained by this method.

Ask our representative or write for your copy.

HELLER & MERZ CORPORATION

DIVISION OF THE CALCO CHEMICAL CO., INC.

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BOSTON CHICAGO SPRINGFIELD, MASS.
35 Hartford St. 146 W. Kinzie St. 40 Albert St.
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Factories
BOUND BROOK, N. J. and NEWARK, N. J.

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SERVICE

TO assure the satisfactory operation of your Centrifugals, Shakers and Drainers under all conditions, specify H & K Perforated Metal Screens, *built to your needs.*

Fitting the screen to the job* is part of our service—and our specialized experience in the paper industry will help you solve your problems *economically.

Write for detailed information

ANY METAL

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ANY PERFORATION

The Harrington & King PERFORATING CO.

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THE DRAPER FELTS

All kinds and styles of Felts for all kinds and styles of Papers.

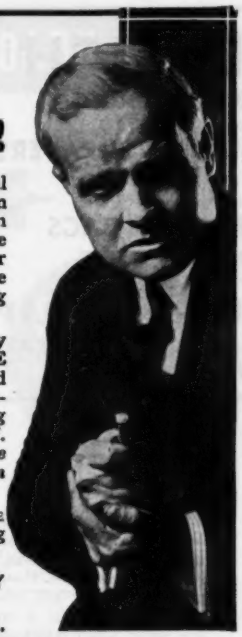
Write us about your Felt problems and let us help you reduce your Felt Costs—we will call anywhere at any time.

DRAPER BROS. COMPANY

CANTON, MASS.

Woolen manufacturers since 1856

They found no trace of slime!



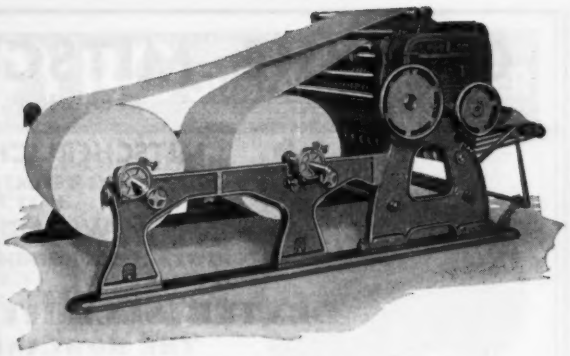
A large pressed paper products mill had to change the color stock from a dark blue to a white bleached. In changing over from the dark to the light color, for three days after cleaning, chunks of dark blue slime kept showing up in the goods being made.

After considerable persuasion, they agreed to give MAGNUS SLIME REMOVER a trial. And they found the results far exceeded their expectations. They were changing from a dark blue to a light buff. When they started up, *not a particle of dark color or slime showed in the work!*

Write today for literature and data sheets on this efficient cleansing agent.

MAGNUS CHEMICAL COMPANY
Manufacturers of Cleaning Materials
24 South Avenue Garwood, N. J.

Magnus SLIME REMOVER



A New Towel Interfolder

Greater production and a better product at a lower cost—therefore profit for the producer.

This machine is operating with an hourly production of 50 to 60 cases of plain or embossed towels per hour.

Embosser may be attached direct between jumbo rolls and interfolder. Product carried direct to banding table.

Used by several manufacturers for interfolding waxed papers or any light weight tissues.

Hudson Sharp Machine Company
Green Bay, Wisconsin

West Virginia Pulp and Paper Company

230 Park Ave
New York

35 East Wacker Drive
Chicago

503 Market St., San Francisco, Cal.
Sixth and Chestnut Sts., Philadelphia, Pa

Manufacturers of

ENGLISH FINISH SUPERCALENDERED
MACHINE FINISHED BOOK
and LITHOGRAPHIC PAPERS

Offset, Envelope, Bond, Writing, Mimeograph, Ledger, Cover and Music Papers, Index Bristol, Post Card and Label Papers

High Grade Coated Book

also

KRAFT WRAPPING AND KRAFT ENVELOPE

Bleached Spruce Sulphite Pulp, Soda and Kraft Pulp

MILLS:

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GENUINE MITSCHERLICH SULPHITE

BLEACHED AND UNBLEACHED

MITSCHERLICH SULPHITE PAPERS

FOR ALL PURPOSES

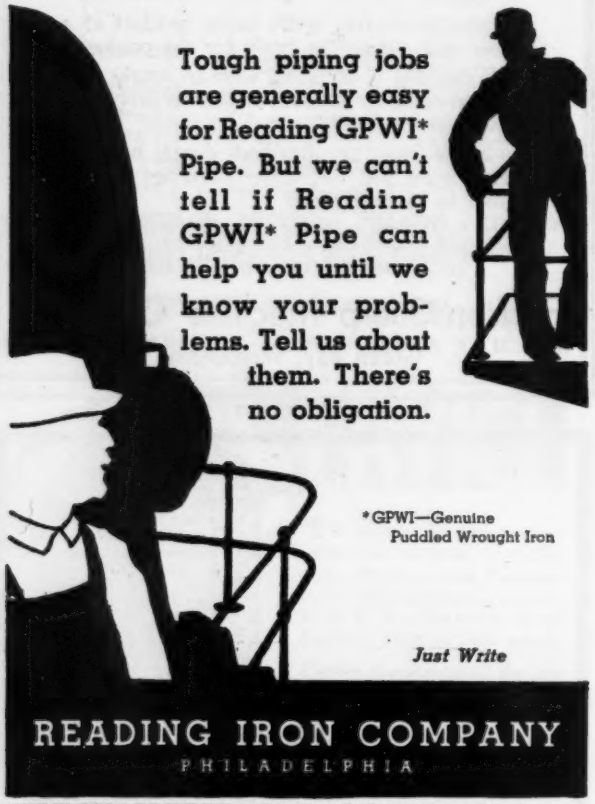
HOWLAND GROCERS BAGS

SELF OPENING, SQUARE AND FLAT

DEXTER SULPHITE PULP & PAPER CO.

THE HOWLAND BAG & PAPER CO.

DEXTER, JEFFERSON CO., N. Y.



Tough piping jobs are generally easy for Reading GPWI* Pipe. But we can't tell if Reading GPWI* Pipe can help you until we know your problems. Tell us about them. There's no obligation.

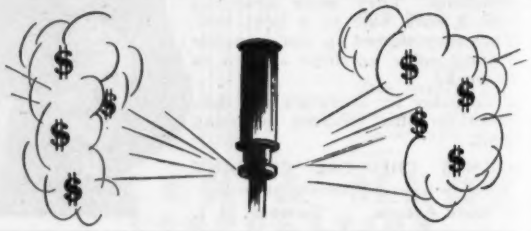
*GPWI—Genuine Puddled Wrought Iron

Just Write

READING IRON COMPANY

PHILADELPHIA

SCIENCE AND INVENTION HAVE NEVER FOUND A SATISFACTORY SUBSTITUTE FOR GENUINE PUDDLED WROUGHT IRON



STEAM COSTS MONEY

When your drying rolls are overheated you are not only wasting steam-money but you are producing a product that is inferior. Likewise, water-logged rolls are objectionable. When the operator checks moving roll temperatures with the Cambridge Surface Pyrometer you not only save money but make a better product.

The instrument is provided with an extension which enables you to obtain temperatures of those hard-to-reach surfaces.

CAMBRIDGE INSTRUMENT CO INC

3732 GRAND CENTRAL TERMINAL, NEW YORK

SURFACE PYROMETERS

Send for details of this instrument. It will help you to save money and make better paper.

J. Andersen & Co.

Selling Agents

21 East 40th Street

New York

CHEMICAL & MECHANICAL PULP

Kraft Pulp

BERGVIK OCH ALA NYA AKTIEBOLAG
Söderhamn, Sweden
KALIX TRÄINDUSTRI AKTIEBOLAG
Vanaförden, Sweden
MUNKSUNDS AKTIEBOLAG
Munksund, Sweden
NENSJÖ CELLULOSA A.-B.
Sprängsvikon, Sweden

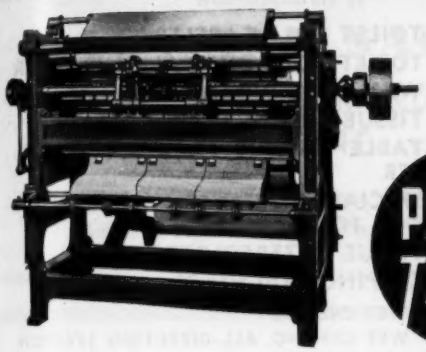
Bleached Sulphite

KELLNER-PARTINGTON PAPER PULP CO., LTD.
Sarpsborg, Norway
Edsvalla, Sweden
Hallein & Villach, Austria

Unbleached Sulphite

AKTIESELSKABET GREAKER CELLULOSEFABRIK
Greaker, Norway
BERGVIK OCH ALA NYA AKTIEBOLAG
Söderhamn, Sweden
CELLULOSEFABRIKS A.-G.
Bratislava, Czecho-Slovakei
SVANÖ AKTIEBOLAG
Svanö, Sweden

FOR FOLDING STANDARD SIZE



PAPER TOWELS

full rotary-ball bearing interfolder

Simply constructed, the upkeep of this machine is next to nothing, although the guaranteed production is 25 cases per hour. Illustrated here is the standard three wide towel interfolder, but this machine can also be built so that it is one, two, three, four or five wide. Towels are slit to their proper size with a score cut slitter running on a hardened surface roll, which gives the ends a smooth shearlike cut. The cut-off mechanism is a full rotary mechanism making a saw tooth cut.

Complete details upon request.

Paper Converting Machine Co., Green Bay, Wisconsin

Designers and manufacturers of High Speed Rotary Folders for napkins, towels and toilet paper; Rotary printing presses for napkins, bags, envelopes; Creping machines, bundling presses and special converting machinery.

PYRO THE IMPROVED SURFACE PYROMETER

A SELF-CONTAINED, RUGGED, QUICK-ACTING, ACCURATE and SCIENTIFICALLY DESIGNED PRECISION INSTRUMENT for CURVED or FLAT, STATIONARY or MOVING SURFACES.

Due to patented clamping-device embodied in indicator —A PYRO FEATURE—contact and reading of actual temperatures no longer have to be made simultaneously.

Extension handles to meet your conditions.

State your requirements and write for special bulletin N-30.

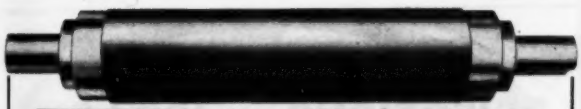
For coal ash fusion determinations and recovery furnace temperatures, etc., we recommend our:

PYRO THE SIMPLIFIED OPTICAL PYROMETER

Ask for special bulletin, describing its advanced and unique features.

THE PYROMETER INSTRUMENT CO.

105-107 LAFAYETTE ST., New York, N. Y. GRANT BLDG., Pittsburgh, Pa.



WALDRON Paper ROLLS

Built Better Last Longer

From a standpoint of Utilization Costs, Waldron Rolls have always proved the most economical to buy. Their longer life is the result of care and precision in design and construction. Paper properly conditioned, shafts and heads perfectly proportioned, a surface smooth and uniform. Naturally they provide a greater number of service hours.

Consult Us On Your Roll Requirements

OVER A CENTURY OF EXPERIENCE BUILDING PAPER CONVERTING MACHINES

JOHN WALDRON CORPORATION

Main Office and Works: NEW BRUNSWICK, N. J.

Chicago New York Portland, Ore.

DEPENDABILITY

Forty-four years of producing machinery parts for the pulp and paper industry give us a distinct advantage in meeting your requirements.

STEEL SHELL BURRS

CALENDER DOCTORS

DOCTOR BLADES

HIGH SPEED DOUBLE DRUM WINDERS

BALL VALVE HYDRANT STOCK CIRCULATING SYSTEM

SLITTER KNIVES

TICONDEROGA MACHINE WORKS

Ticonderoga, N. Y.

WHY NOT

REDUCE YOUR FOURDRINIER WIRE COSTS BY USING A WIRE THAT WILL GIVE YOU ALL AROUND SERVICE.

USE

A WIRE WITH A NON-CRACK PATENTED SELVIDGE

PURVES WIRES

ARE AS GOOD AS THE BEST.

PURVES MACHINE WIRE COMPANY, INC.
HOLYOKE, MASSACHUSETTS

CANNARD

PAPER MAKING & FINISHING MACHINES

- TOILET ROLL LABELER
- TOILET ROLL OVER-ALL WRAPPER
- WAX ROLL WRAPPER
- TISSUE ROLL WRAPPER
- TABLE NAPKIN PACKAGE WRAPPER
- SPECIAL DISPENSER TABLE NAPKIN FOLDER
- TISSUE INTERFOLDERS
- CREPING MACHINES
  - WET CREPING
  - WET CREPING, ALL-DIRECTION STRETCH
  - DRY CREPING
  - DRY CREPING, ALL-DIRECTION STRETCH
- REENFORCING MACHINE — FOR DUPLEX SHEET
- INTEGRAL REENFORCING UNIT — PAPER MACHINE ATTACHMENT
- PULP HYDRATORS

Information and specifications of any of these machines will be furnished promptly.

THE CANNARD COMPANY
110 SOUTH WASHINGTON STREET
GREEN BAY WISCONSIN

CASEIN

CASEIN-CO — A BORDEN PRODUCT — BRAND

Uniform Quality — Dependable Service

THE CASEIN MFG. COMPANY OF AMERICA, Inc.
350 Madison Ave. New York, N. Y.
Oldest and Largest Producers of Casein in America

MARKET YOUR

REJECTIONS AND JOB LOTS

thru

THE SABIN ROBBINS PAPER COMPANY
CINCINNATI, O.

We handle your rejections strictly according to the N. R. A. Code

PERMANENT COLORS

Browns Greens Reds Yellows

BROWNS
Oxides of Iron
Turkey Umbers

GREENS
Chromic Oxides
Guignet's Green

REDS
All types and shades of Oxides of Iron

YELLOWS
Ochres
Iron Hydroxides

Asbestines and Talcs for Fillers

C. K. WILLIAMS & CO.
EASTON, PA.

DANDY ROLLS

Our improved method insures a tightly correct roll eliminating seam markings—clogging and other difficulties resulting from slack facing.

Only highest grade selected wire cloth adapted for dandy roll facings is used. Let us help you with your dandy roll problems.

THE F. G. DURKEE CO.
320 W. TAYLOR ST. SYRACUSE, N. Y.

Gilman Paper Company

Manufacturers of

BAGS AND SACKS

KRAFT PAPER, GUMMED and NEWSPRINT

Sales Offices, 475 Fifth Ave., New York
Mills and Bag Factory at Gilman, Vermont

GLAZED TILE TANKS

Cost less and much more durable than concrete or cypress. Cleaner. Will not "slime up." Over 300 now in use in mills from Maine to Minnesota.

KALAMAZOO
TANK and SILO COMPANY
Kalamazoo Michigan

We've been building wood stock chests, acid tanks and blow pits for over 60 years.

E. J. KELLER CO., INC.

IMPORTERS OF RAGS AND WOODPULP

200 FIFTH AVENUE
TELEPHONE
GRAMERCY 5-6380

OLD AND NEW COTTON RAGS
OLD AND NEW LINEN RAGS
COTTON JUTE AND FLAX
WASTES—WOODPULP

GEORGE F. HARDY

Consulting Engineer

305-309 Broadway, New York City, N. Y.

Member—Am. Soc. C.E.—Am. Soc. M.E.—Eng. Inst. Can.

Consultation
Reports
Valuations
Estimates

Paper and Pulp Mills
Hydro-Electric and
Steam Power Plants
Plans and Specifications

Mill Cogs

ON SHORTEST POSSIBLE NOTICE

We make all kinds of Mill Cogs and have special facilities that will be of great service to you. We make a specialty of "ready dressed" cogs which are

READY TO RUN

the moment driven and keyed. Write at once for circular "G" and instruction sheets free.

THE N. P. BOWSHER CO.
South Bend, Ind.
Established 1882

Dietz Towel Interfolding Machines
also

TOILET PAPER MACHINES

For making Toilet and Paper Towel Rolls
(With or without perforations)

AUTOMATIC TUBE MACHINES

For Making Wire-Stitched Toilet Tubes

Sanitary Crepe Towel Machines, Roll Tighteners, Slitting and Rewinding Machines, Drop Roll Slitting Machines, Photo Mount Beveling Machines, Rotary Card Cutting Machines, etc.
Correspondence solicited

DIETZ MACHINE WORKS

126-128 W. Fontaine Street
Cor. Waterloo St. (between Front & Second Sts.)
and below Diamond St.
Phila., Penna., U. S. A.

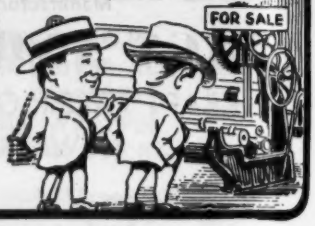
EASTON, PENNSYLVANIA, U.S.A. PAPER MAKERS IMPORTING CO. INC. AMI INC

FINEST PAPER CLAYS

WINDERS AND REWINDERS

SAMUEL M. LANGSTON COMPANY
CAMDEN, NEW JERSEY

The CLEARING HOUSE of THE PAPER TRADE



"SITUATIONS WANTED" ADVERTISEMENTS—4c a word, double rates for heavy face type. Minimum charge $1.00. If repeated ½ rate will be charged for each consecutive repetition.

"HELP WANTED" ADVERTISEMENTS—4c a word. Double rate for heavy face type. Minimum charge $1.00.

CLASSIFIED ADVERTISEMENTS—4c a word. Double rate for heavy face type. Minimum charge $1.00.

All classified "Help Wanted" and "Situation Wanted" advertisements are payable in advance.

HELP WANTED

SALARIED POSITIONS. $2,500 to $25,000. This thoroughly organized advertising service of 25 years' recognized standing and reputation carries on preliminary negotiations for positions of the calibre indicated, through a procedure individualized to each client's personal requirements. Several weeks are required to negotiate and each individual must finance the moderate cost of his own campaign. Retaining fee protected by a refund provision as stipulated in our agreement. Identity is covered and, if employed, present position protected. If you have actually earned over $2,500, send only name and address for details. R. W. Bixby, Inc., 117 Delward Bldg., Buffalo, N. Y.

SALESMAN—One who is interested in side line of toilet tissues, towels and napkins, for New York State, on a commission basis. Address Box 35-58, care Paper Trade Journal. F-28

WANTED—Man experienced in making up job analysis, standards and duties of the various operations in Shipping, Finishing, Machine, Beater, Bleaching, Power, etc., departments in Paper Mill. Give complete and detailed information regarding self, experience, etc. Give references and salary expected. Address Box 35-82, care Paper Trade Journal. F-28

WANTED—First class Brannan Folder Operator. Experienced on high grade tissues. References required. Address Box 35-87, care Paper Trade Journal. M-7

WANTED—Young Plant Engineer with Paper, Coating, Power experience. Address Box 35-88, care Paper Trade Journal. F-21

SITUATIONS WANTED

GENERAL SUPERINTENDENT with experience in pulp and paper specialties, desires change. Address Box 35-74, care Paper Trade Journal. F-28

ASSISTANT SUPERINTENDENT—5 years' present employer seeks change. Fully experienced sulphite papers, kraft, sulphite and jute boards. Address Box 35-83, care Paper Trade Journal. F-21

SUPERINTENDENT desirous of change, would like Specialty Mill, Rope, Jute, Kraft. Practical paper maker. Address Box 35-63, care Paper Trade Journal. M-14

REAL Paper Mill Master Mechanic wishes change. Have thorough knowledge of remodeling and maintenance. 24 years' practical experience. Would consider medium wage. References. Address Box 35-45, care Paper Trade Journal. F-28

PLANT ENGINEER with extensive experience in design, construction, maintenance and operation, now employed, desires new connection. Address Box 35-93, care Paper Trade Journal. F-28

SITUATIONS WANTED

EXPERIENCED Envelope Man at present employed wishes to change. Thoroughly experienced adjuster on all new type Rotary Machines and plungers. Also experienced foreman and superintendent. Good references and good reason for wanting change. Address Box 35-89, care Paper Trade Journal. F-28

BOSS FINISHER would like position in mill making Bond, Linen and Ledgers. Address Box 35-90, care Paper Trade Journal. F-21

PRACTICAL AND TECHNICAL trained paper chemist, aggressive young man, who is a good paper maker, and is thoroughly familiar with production, with many years of experience in plant control, development and consulting work, wants to hear from progressive concern. Experienced in book, offset, ledger, bond, writing, mimeo and tissue. At present in charge of research and control. Fourteen years of experience. Chemical Engineer graduate. Interested more in opportunity than in money. Address Box 35-91, care Paper Trade Journal. F-21

TECHNICAL SERVICE—University graduate, high grade technologist with ten years' experience in pulp, paper, board and specialty mills. Desire sales or service connection in paper manufacturing or converting field. Excellent credentials. Address Box 35-92, care Paper Trade Journal. F-28

Address Replies

to advertisements appearing under Box Numbers in care of

PAPER TRADE JOURNAL
15 West 47th Street
New York, N. Y.

MISCELLANEOUS

CLARK MANUFACTURING COMPANY, Holyoke, Mass. Telephone 2-4370. Builders of cylinder moulds, couch and felt rolls, dandy rolls. We cover dandies and cylinders tight for fast running machines. tf.

WANTED

WANTED—Two Moore and White Screens with circular plates, old type. Address Box 35-67, care Paper Trade Journal. F-28

WANTED—For manufacturing and sale on exclusive Royalty basis, proven devices of merit for Paper Mills. Old established concern with complete manufacturing facilities—foundry, machine shop, and wood working departments in Massachusetts. Address Box 35-86, care Paper Trade Journal. F-28

WANTED—One 82 paper machine Bird Screen. Give serial number, price and location. Address Box 35-77, care Paper Trade Journal. F-28

WANTED—One color rotary press suitable for printing toilet paper labels. Address Box 35-78, care Paper Trade Journal. F-28

WANTED—Ten 4' diameter by 132" face paper machine dryers. State price, location and age, also name of manufacturer. Address Box 35-79, care Paper Trade Journal. F-28

WANTED—Used paper napkin quarterfolding machine; one with embossing attachment preferred. Address Box 35-76, care Paper Trade Journal. F-28

WANTED—Direct source of supply on typewriter paper. No jobbers need answer. We are only interested in dealing direct with mills. We maintain a very large store for distribution of these papers at retail. We own the nine dandy rolls covering this complete line of High-Point boxed typewriter papers. Address John McCabe & Co., 39 Cortlandt St., New York. F-28

WANTED—Roll paper embossing machine. Embossing surface 40" or wider. State condition and price. Mid-States Gummed Paper Co., 2433 South Damen, Chicago, Ill. F-21

WANTED—One 42" Cameron Slitter for small rolls. Must be reasonable. Address Box 35-85, care Paper Trade Journal. F-21

WANTED—1 almost new N & W Mammoth Jordan built 1930—Anti-friction bearing. 1 Miami No. 6 Jordan built 1929 with anti-friction bearings. Address Box 35-98, care Paper Trade Journal. M-7

WANTED

WANTED—Various lines and types of paper products to be added to our regular line of baking cups and kindred articles to be sold to bakers, confectioners and restaurants. Specialties preferred. Correspondence invited. Address Box 35-94, care Paper Trade Journal. M-14

WANTED to buy for early delivery—one 86" to 100" used board machine having 6 cylinders, or 7. Price must be right for cash, f.o.b. cars, point of shipment. Give full description in first letter. Address Box 35-95, care Paper Trade Journal. M-7

WANTED—Special lots of Paper in Rolls or Sheets of any description either in Groundwood, Sulphite, Kraft or Book Paper—Bleached or unbleached. State sizes and quantities and best prices, F.O.B. New York. Address Box 35-96, care Paper Trade Journal. M-14

FOR SALE

PAPER COATING MACHINERY—Waxing, Oiling, Gumming, Gluing, Asphalt Duplexing Laboratory Coating and Treating machines. High speed. New improvement. MAYER COATING MACHINES COMPANY, INC., Rochester, N. Y. T F

FOR SALE

Fourdrinier Paper Machines with wires 107" —97"—90"—88". New Cylinder Paper Machines 90" wide. Hamblet & Moore & White Cutters 36" to 90" wide.

FRANK H. DAVIS COMPANY

175 Richdale Ave. Cambridge, Mass. TF

FOR SALE

FOR SALE

ONE STURTEVANT PULPER

USED TWO YEARS

SHARTLE BROTHERS MACHINE CO.

MIDDLETOWN, OHIO M-7

FOR SALE—74" Seybold "Holyoke" Paper Cutter Heavy Duty Machine, condition guaranteed. Address Box 35-39, care Paper Trade Journal. F-21

FOR SALE—Four Universal Type No. 6 Cameron Slitters and Rewinders. One 57" and three 62" machines, complete and in good condition. Reasonable price, immediate delivery. Address Box 35-97, care Paper Trade Journal. F-21

FOR SALE

FOR SALE—Paper Mill, ideal location. Diversified line and good market for product. Machinery almost like new. Would consider sale of all machinery. Address Box 35-99, care Paper Trade Journal. M-7

BUSINESS OPPORTUNITY

EXECUTIVE of an old established Fine Paper Jobbing House, who is making a trip to Palestine and Egypt, would like to hear from Paper Mills or Jobbing Houses who have any kind of paper which they may want to dispose of abroad rather than in this country. This party is also interested in buying an entire plant or part of a plant for paper converting, manufacturing stationery or anything else connected with paper industry. Address Box 35-100, care Paper Trade Journal. F-21

Classified Advertising

Brings Results

THE PUSEY AND JONES CORPORATION

Established 1848

WILMINGTON, DELAWARE

PULP MILL MACH'Y FINISHING ROOM MACH'Y

— FRICTION CLUTCHES —

THE MOORE & WHITE CO.
PHILADELPHIA, PA.
N. PHILA. STA. PENNA. R.R.
PAPER MILL MACHINERY

MARTEL, CATALA & CIE

SELESTAT, FRANCE

Manufacturers of High Grade

FOURDRINIER WIRES

(Now furnished with welded joint. U. S. Pat. No. 1955517)

CASTLE & OVERTON, INC.

200 FIFTH AVENUE NEW YORK, N. Y.

Sole Agents for United States and Canada

DRY PAPER EVENLY

Stickle Automatic Steam Controls
Drainage systems for Dryers and heating systems
Condensation economizers for heating air
Deaerating feed water heaters, reducing valves, steam traps, oil and steam separators.

STICKLE STEAM SPECIALTIES CO.,

2217 Valley Ave. Indianapolis, Ind.

INDUSTRIAL TYCOL OILS-GREASES

A COMPLETE LINE

SCIENTIFICALLY ENGINEERED

for Every Industrial Use

TIDE WATER OIL COMPANY

17 Battery Place, New York, N. Y.

HARDY S. FERGUSON & CO.

Consulting Engineers

200 FIFTH AVENUE, NEW YORK CITY

Hardy S. Ferguson ..... Member A.S.C.E., A.S.M.E., E.I.C.
Moses H. Teare ..... Member A.S.M.E., E.I.C., A.S.C.E.
J. Wallace Tower ..... Member A.S.C.E., A.S.M.E.

Consultation, reports, valuations, and complete designs and engineering supervision for the construction and equipment of

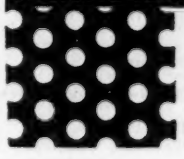
Pulp and Paper Mills and other Industrial Plants.
Steam and Hydro-electric Power Plants.
Dams and other Hydraulic Structures.

INTERNATIONAL WIRE WORKS

Fourdrinier Wires

MENASHA, WISCONSIN

PERFORATED METAL SCREENS

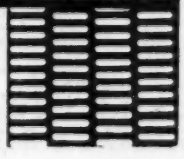


MADE SPECIALLY FOR PAPER and PULP MILL USE

Copper, bronze, steel or other metals. Heat-treated.

HENDRICK MFG. CO.

50 Dundaff St. Carbondale, Pa.
Offices in Principal Cities



WHERE TO BUY

ABRASIVES
Carborundum Co.
The Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc.
Norton Co

ACIDS (Sulphuric)
American Cyanamid & Chem. Corp.
Pennsylvania Salt Co.

ADHESIVE APPLYING MACHINES
Potdevin Machine Co.
John Waldron Corp.

AGITATORS
Carthage Machine Co.
Dilts Machine Works, Inc.
Downingtown Mfg. Co.
Hauser Stander Tank Co.
Improved Paper Mchy. Corp.
Moore & White Co.
Valley Iron Works Co.

AGITATOR EQUIPMENT
Downingtown Mfg. Co.
Improved Paper Mchy. Corp.

AIR CONDITIONING EQUIPMENT
Ross Engrg. Corp., J. O.
Thwing Instrument Co.

AIR DRYING MACHINERY
Waldron, John, Corp

AIR PREHEATING UNITS
Ross Engineering Corp., J. O.

ALLOYS
Chromium Corporation of America
Electro-Alloys Co., The
International Nickel Co.
Kropp Forge Co.
Pusey and Jones Corp.

ALUM
American Cyanamid & Chemical Corp.
Paper Makers Chemical Corp.
Pennsylvania Salt Mfg. Co.

AMMONIA
American Cyanamid & Chem. Corp.
Mathieson Alkali Works, Inc.
Pennsylvania Salt Co.

ARCHITECTS AND ENGINEERS
Ferguson, Hardy S.
Hardy, George F.

ARMORING FLOOR
Hendrick Mfg. Co.

ASBESTINE PULP
International Pulp Co.

AUTOMATIC WATER FEEDER
Control Equipment Corp.
Merritt Engineering & Sales Corp., The

BACKING WIRES
Appleton Wire Works
International Wire Works

BAG MACHINES
Potdevin Machine Co.
Smith & Winchester Mfg. Co.

BALERS
Ohio Cultivator Co.

BARKERS
Carthage Machine Co.
Valley Iron Work Co.

BARS (Beater)
Improved Paper Mchy. Corp.
International Nickel Co.

BEARINGS
Chain Belt Co.
Improved Paper Mchy. Corp.
Link-Belt Co.
Montague Machine Works
S. K. F. Industries
The Manhattan Rubber Mfg. Co.
Timken Roller Bearing Co.

BEATERS
The Appleton Machine Co.
Dilts Machine Works, Inc.
Downingtown Mfg. Co.
Improved Paper Mchy. Corp.
Jones & Sons Co., E. D.
Shartle Bros. Mch. Co.
Valley Iron Works Co.

BEATER ATTACHMENTS
Bird Machine Company

BEATER BED PLATES
Dilts Machine Works, Inc.
E. D Jones & Sons Co.
Taylor, Stiles & Co.
Valley Iron Works Co.

BEATER CONTROLS
Thwing Instrument Co.

BEATER ENGINE BARS
Dilts Machine Works, Inc.
E. D. Jones & Sons Co.
Taylor Stiles & Co.
Valley Iron Works Co.

BEATER HOODS
Dilts Machine Works, Inc.
E. D. Jones & Sons Co.

BEATER ROLLS
Dilts Machine Works, Inc.
E. D. Jones & Sons Co.

BEATER STOCK RECORDER
Bristol Co., The
Control Equipment Corp.
Merritt Engineering & Sales Corp., The

BELTING
Goodrich Rubber Co.
Goodyear Tire & Rubber Co.
The Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc.
Rhoads Sons, J. E.
U. S. Rubber Co.

BITUMINOUS COAL
The Reading Iron Co.

BLEACH EJECTORS
Perkins & Sons, Inc., B. F.

BLEACHING APPARATUS
E. D. Jones & Sons Co.
Moore & White Co.

BLEACHING POWDER
Mathieson Alkali Works, Inc.
Pennsylvania Salt Co.

BLEACHING PROCESS
Electro Bleaching Gas Co.
Pennsylvania Salt Mfg. Co.

BLOW PIPING
Moore & White Co.

BLOW PITS
Hauser Stander Tank Co.
Kalamazoo Tank & Silo Co.

BLOWERS (CENTRIFUGAL)
De Laval Steam Turbine Co.
Ross Engineering Corp., J. O.
Sturtevant Co., B. F.

BOILER PRESERVATIVES
Magnus Chemical Co.

BOILER TUBES
The Reading Iron Co.

BOTTOMS (Steel & Wood)
Harrington & King Perforating Co.
Hauser Stander Tank Co.
Kalamazoo Tank & Silo Co.

BRASS COLLAPSIBLE SHAFTS
Moore & White Co., The

BREAKER BEATER WATER FEEDER
Control Equipment Corp.
Merritt Engineering & Sales Corp., The

BUCKETS (elevating)
Chain Belt Co.
Hendrick Mfg. Co.
Link-Belt Co.

BULKERS (Pressure)
B. F. Perkins & Son, Inc.

BUNDLING PRESSES
Paper Converting Machine Co., Inc.
Potdevin Machine Co.

BURSTING TESTERS
B. F. Perkins & Son Co.
Testing Machines, Inc.

CALCIUM HYPOCHLORITE
Mathieson Alkali Works, Inc.
Pennsylvania Salt Mfg. Co.

CALENDERS
Beloit Iron Works
Downingtown Mfg. Co.
Farrel-Birmingham Co.
Lobdell Car Wheel Co.
Moore & White Co.
Norwood Engrg. Co.
Perkins & Son, Inc., B. F.
Smith & Winchester Mfg. Co.
Textile Finishing Mchy. Co.

CALENDER DOCTORS
Downingtown Mfg. Co.
Ticonderoga Machine Works

CALENDER ROLL GRINDERS
Farrel-Birmingham Co.
Lobdell Car Wheel Co.
Smith & Winchester Mfg. Co.
Ticonderoga Machine Works

CALENDER ROLLS
Farrel-Birmingham Co.
Lobdell Car Wheel Co.
Perkins & Son, Inc., B. F.
Smith & Winchester Mfg. Co.
Textile Finishing Mchy. Co.
Waldron, Corp., John

CALIPERS (Micrometer Roll)
Farrell-Birmingham Co.
Lobdell Car Wheel Co.

CAMERAS (Photomicrographic)
Bausch & Lamb Optical Co.

CARBON BISULPHIDE
Pennsylvania Salt Co.

CASEIN
American Cyanamid & Chemical Corp.
The Casein Manufacturing Co. of America
Paper Makers Chemical Corp.

CASING
The Reading Iron Co.

CASTINGS
Carthage Machine Co.
Chain Belt Co.
International Nickel Co.
Farrel-Birmingham Co.
Lobdell Car Wheel Co.
Montague Machine Co.
Smith & Winchester Mfg. Co.
Pusey and Jones Corp.

CASTINGS (Brass, Bronze, Iron)
Downingtown Mfg. Co.
Smith & Winchester Mfg. Co.

CASTING (Chrome Nickel Alloy)
Lobdell Car Wheel Co.

CASTINGS (Iron)
Chain Belt Co.
Downingtown Mfg. Co.
Hamblet Machine Co.
Link-Belt Co.

CAUSTIC SODA
American Cyanamid & Chemical Corp.
Mathieson Alkali Works, Inc.
Paper Makers Chemical Corp.
Pennsylvania Salt Mfg. Co

CELLULOSE BAG MACHINERY
Potdevin Machine Co

CENTRIFINERS
Bird Machine Company

CENTRIFUGALS
Bird Machine Company

CENTRIFUGAL MACHINERY (Special)
De Laval Steam Turbine Co.

CHAIN DRIVES
Chain Belt Co.
Link-Belt Co.

CHEMICALS
American Cyanamid & Chemical Corp.
E. I. DuPont de Nemours & Co., Inc.
Electro Bleaching Gas Co.
General Dyestuff Corp
Geigy Co., Inc.
Gottesman & Co., Inc.
Paper Makers Chemical Corp.
Williams & Co., C. K.

CHIPPERS
Carthage Machine Co.
Valley Iron Works Co.

CHLORINE
Electro Bleaching Gas Co.
Mathieson Alkali Works, Inc.
Pennsylvania Salt Co.

CHROME PLATE
Chromium Corporation of America

CHUCKS
John Waldron Corp.

CLAY
American Cyanamid & Chemical Corp.
English China Clays Sales Corporation
Paper Makers Importing Co.
Vanderbilt Co., R. T.

CLEANERS (Wire)
Bird Machine Company

CLEANING MATERIALS
Magnus Chemical Co.

CLUTCHES
Chain Belt Co.
Link-Belt Co.
Moore & White Co.
Pusey and Jones Corp.
T. B. Wood's Sons

CLUTCH PULLEYS
Moore & White Co.
T. B. Wood's Sons

COATING MACHINERY
Moore & White Co.
Potdevin Machine Co.
Waldron Corporation, John

COATING MATERIALS
Paper Makers Chemical Corp.

COCKS, Lubricated
Crane Company

COGS
Bowsher, N. P., The

COLLAPSIBLE WINDER SHAFTS
Moore & White Co.

COLORIMETERS
Bausch & Lomb Optical Co.

COLOR ANALYZERS
Thwing Instrument Co.

COLOR MIXING EQUIPMENT
Waldron, John, Corp.

COMBINING MACHINES
Waldron Corp., John

COMPRESSORS (Air)
Allis-Chalmers Mfg. Co.

COMPRESSORS (Centrifugal)
De Laval Steam Turbine Co.

CONDITIONERS (Felt)
Bird Machine Company

CONSISTENCY REGULATOR
Merritt Engineering & Sales Corp., The
Trimbey Machine Works

CONTINUOUS BEATER ATTACHMENTS
E. D. Jones & Sons Co.

CONTINUOUS BEATERS
E. D. Jones & Sons Co.
Improved Paper Mchy. Corp.
Valley Iron Works Co.

CONTINUOUS BEATER WATER FEEDER
Control Equipment Corp.
Merritt Engineering & Sales Corp., The
Trimbey Machine Works.

CONTROLLING INSTRUMENTS
Bristol Co., The
Cambridge Instrument Co.
Control Equipment Corp.
Merritt Engineering & Sales Corp., The
Testing Machines, Inc.
Thwing Instrument Co.

CONTROLS (Electric)
Thwing Instrument Co.

CONVEYOR CHAINS
Chain Belt Co.
Link-Belt Co.

CONVEYORS (Trim)
Link-Belt Co.
Ross Engineering Corp., J. O

COOKING & RECOVERY PROCESS
Chemipulp Process, Inc.
Ross Engineering Corp., J. O

CORES (Paper)
Climax Tube Co.
Elixman Paper Co.

CORES (Steel)
Smith & Winchester Mfg. Co.

COTTON CALENDER ROLLER
Perkins & Son, Inc., B. F.
Textile Finishing Mchy. Co.

COUCH ROLLS
American Wringer Co.
Beloit Iron Works
Goodrich Rubber Co., B. F.
Montague Machine Co.
Moore & White Co., The
The Manhattan Rubber Mfg Division of Raybestos-Manhattan, Inc.
Pusey and Jones Corp.

COUPLINGS
Chain Belt Co.
De Laval Steam Turbine Co.
Philadelphia Gear Works
T. B. Wood's Sons
The Reading Iron Co.
Waldron Corp., John
Walworth Co.

CREPING MACHINES
Beloit Iron Works
Downingtown Mfg. Co.
Paper Converting Machine Co., Inc.
John Waldron Corp.

CUTTERS
Downingtown Mfg. Co.

CYLINDER RAILROAD AND DEVIL DUSTER
Moore & White Co.

CYLINDER DRIVES
Moore & White Co., The

CYLINDER MOULDS
Beloit Iron Works
Carthage Machine Co
Improved Paper Mchy. Corp.
Downingtown Mfg. Co.

CYLINDER MOULD COVERINGS
Durkee Co., The F. G.

CYLINDER WIRES
Appleton Wire Works
International Wire Works

DAMPENERS
Perkins & Son, Inc., B. F.

DANDY ROLLS
Durkee Co., The F. G.

DECKERS
Carthage Machine Co.
Improved Paper Mchy. Corp.
Montague Machine Co.
Oliver United Filters Inc.
Valley Iron Works

DEFOAMERS
National Oil Products Co.

WHERE TO BUY

DENSITY REGULATOR
Control Equipment Corp.
Merritt Engineering & Sales Corp., The
DENSOMETERS
W. & L. E. Gurley
DIE CUTTERS
Appleton Machine Co., The
DIGESTERS
Pusey & Jones Corp.
DOCTORS
Bird Machine Company
DOCTOR BLADES
Goodrich Rubber Co., B. F.
Improved Paper Mchy. Corp.
International Nickel Co.
The Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc
DRAINAGE SYSTEMS
Stickle Steam Specialties Co.
DRIVES
Bird Machine Company
DRIVE STANDS
Beloit Iron Works
Moore & White Co.
Pusey and Jones Corp.
DRIVES (Paper Machinery)
Beloit Iron Works
Chain Belt Co.
Farrel-Birmingham Co.
General Electric Co.
Link-Belt Co.
Pusey & Jones Corp.
DRYING SYSTEMS
Ross Engineering Corp., J. O.
Waldron Corporation, The
DUSTING MACHINERY
Carthage Machine Co.
Jones & Sons Co., E. D.
Moore & White Co.
DYESTUFFS & COLORS
Campbell & Co., John
E. I. DuPont de Nemours & Co.
General Dyestuff Corp.
Heller & Merz
Geigy Co., The
National Aniline & Chemical Co.
United Color & Pigment Co.
C K Williams & Co.
ELECTRIC EQUIPMENT
Allis-Chalmers Mfg. Co.
General Electric Co.
ELEVATORS
Chain Belt Co.
EMBOSSING CALENDERS
Perkins & Sons, Inc., B. F.
Textile Finishing Machinery
EMBOSSING MACHINES
Hudson Sharp Machine Co.
Paper Converting Machine Co.
John Waldron Corp.
EMBOSSING ROLLS
The Appleton Machine Co.
Hudson Sharp Machine Co.
B. F. Perkins & Son, Inc.
Textile Finishing Mchy. Co.
Waldron Corporation, John
EXHAUST FANS
Propellair, Inc.
EXTRACTORS
Downingtown Manufacturing Co.
Valley Iron Works Co.
EXTRACTORS (Beater)
Bird Machine Company
FANS
E. D. Jones & Sons Co.
B. F. Perkins & Son, Inc.
Propellair, Inc.
Ross Engineering Co., J. O.
Sturtevant Co., B. F.
FAN PUMPS
Beloit Iron Works
Carthage Machine Co.
Moore & White Co.
Pusey and Jones Corp.
Valley Iron Works Co.
Smith & Winchester Mfg. Co.
FELT CARRIER ROLLS
American Wringer Co.
Beloit Iron Works
Downingtown Mfg. Co.
Goodrich Rubber Co., B. F.
Pusey and Jones Corp.
FELT CLEANERS
Magnus Chemical Co
FELTS AND JACKETS
Appleton Woolen Mills
Bulkley, Dunton & Co.
Draper Bros. Co.
Huyck & Son, E. C.
Knox Woolen Co.
Lockport Felt Co.
Orr Felt & Blanket Co.
Philadelphia Felt Co.
Shuler & Benninghofen
Turner, Halsey Co.
Waterbury Felt Co.

FELT GUIDES
Moore & White Co.
FELT SOAPS
Magnus Chemical Co.
FELT TIGHTENER (Automatic)
Pusey and Jones Corp.
John Waldron Corp.
FILLINGS (Jordan)
Internstional Nickel Co.
FILTERS
Improved Paper Mchy. Corp.
Moore & White Co.
Norwood Engrg. Co.
Oliver United Filters Inc.
J. O. Ross Engrg. Corp.
FILTER CLEANERS
Magnus Chemical Co.
FILTER WIRES
Appleton Wire Works
FITTINGS (Pipe)
Crane Company
Walworth Company
FITTINGS, Pipe (Plain end or flanged)
Taylor Forge & Pipe Works
FITTINGS, Pipe Welding
Taylor Forge & Pipe Works
FLANGES
Crane Company
Walworth Co.
FLANGES, Pipe (Forged Steel)
Taylor Forge & Pipe Works
FLAT SCREENS
The Appleton Machine Co.
Beloit Iron Works
Downingtown Mfg. Co.
FLEXIBLE COUPLINGS
Chain Belt Co.
De Laval Steam Turbine Co.
Link-Belt Co.
John Waldron Corp.
Philadelphia Gear Works
T. B. Wood's Sons
FLEXIBLE SLICE
E. D. Jones & Sons Co.
FLEXIBLE STEEL LACING
Flexible Steel Lacing Co.
FLOOR TILE (Non-Slip)
American Pressed Steel Co.
Carborundum Co.
Norton Co.
FLY BARS
Dilts Machine Works, Inc.
Jones & Sons Co., E. D.
FOLDING ENDURANCE TESTERS
Testing Machines, Inc.
FOLDING MACHINES
Hamblet Machine Co.
Hudson Sharp Machine Co.
Paper Converting Machine Co., Inc.
Waldron, John, Corp.
FORGINGS (Drop & Hammer)
Kropp Forge Company
FORMING MACHINES
Downingtown Mfg. Co.
FOURDRINIER MACHINES
Downingtown Mfg. Co.
FOURDRINIER WIRES
Appleton Wire Works
International Wire Works
Lindsay Wire Weaving Co.
FREENESS RECORDERS
Trimbey Machine Works
FREENESS TESTERS
Testing Machines, Inc.
FRICTION CALENDERS
Perkins & Son, Inc., B. F.
Textile Finishing Mchy. Co.
FRICTION CLUTCHES
Beloit Iron Works
Link-Belt Co.
T. B. Wood's Sons
Moore & White Co
Pusey and Jones Corp.
GEARS
Chain Belt Co.
Farrel-Birmingham Co.
De Laval Steam Turbine Co.
E. D. Jones & Sons Co.
Improved Paper Mchy. Corp.
Link-Belt Co.
Moore & White Co.
Philadelphia Gear Works
Sturtevant Co., B. F.
Pusey and Jones Corp.
John Waldron Corp.
GENERATORS
De Laval Steam Turbine Co
General Electric Co.
GRANITE ROLLS
Beloit Iron Works
Downingtown Mfg. Co.
Perkins & Sons, Inc., B. F.
Pusey and Jones Corp.
GRATING (Sidewalk)
Hendrick Mfg. Co.

GRINDERS
Carthage Machine Co.
Montague Machine Co.
GRINDING WHEELS
E. C. Atkins & Co.
Carborundum Co.
Norton Co.
The Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc.
GUIDES (Automatic Web)
John Waldron Corp.
GUIDES (FELT)
Moore & White Co.
GUMMING AND GLUING MACHINERY
Potdevin Machine Co.
Waldron Corporation, John
GUMMED TAPE TESTERS
Thwing Instrument Co.
HAND CLEANER
Magnus Chemical Co.
HAND CLEANER DISPENSERS
Magnus Chemical Co.
HEATERS (Unit)
J. O. Ross Engrg. Corp.
HEATING AND VENTILATING SYSTEMS
Ross Engineering Corp., J. O.
HEAVY MACHINERY
The Reading Iron Co.
HIGH DENSITY THICKENERS
Moore & White Co.
HOISTS (ELECTRIC)
General Electric Co.
HYDRAULIC MACHINERY
Farrel-Birmingham Co.
INDICATORS
Cambridge Instrument Co.
The Bristol Co.
Testing Machines, Inc.
INTERFOLDING MACHINES
Hudson Sharp Machine Co.
Paper Converting Machine Co., Inc.
John Waldron Corp.
INSTRUMENTS
Cambridge Instrument Co.
The Bristol Co.
W. & L. E. Gurley
Testing Machines, Inc.
Thwing Instrument Co.
IRON CASTINGS
The Reading Iron Co.
JORDANS
The Appleton Machine Co.
Jones & Sons Co., E. D.
Smith & Winchester Mfg. Co.
Valley Iron Works
JORDAN FILLINGS
Bahr Bros. Mfg. Co., The
Jones & Sons Co., E. D.
Smith & Winchester Mfg. Co.
Valley Iron Works
KNIVES, ETC.
E. C. Atkins & Co.
Carthage Machine Co.
Dilts Machine Works, Inc.
Hamblet Machine Co.
Taylor, Stiles & Co.
LABELLING MACHINES
Potdevin Machine Co.
LABORATORY EQUIPMENT
E. D. Jones & Sons Co.
Pusey and Jones Corp.
Testing Machines, Inc.
Thwing Instrument Co.
Valley Iron Works.
LATEX
Heveatex Corporation
LATHES
Montague Machine Co.
LAY BOYS
Hamblet Machine Co.
Moore & White Co.
LEVELERS
National Oil Products Co.
LITHOPONE
United Color & Pigment Co.
LOFT DRYERS
Ross Engineering Corp., J. O.
John Waldron Corp.
LUBRICANTS
Gulf Refining Co.
Socony-Vacuum Corporation
NIPPLES
The Reading Iron Co.
MACHINE PARTS (Forged)
Kropp Forge Co.
MAGNIFIERS (Pocket)
Bausch & Lomb Optical Co.
METERING & PROPORTIONING SYSTEMS
Trimbey Machine Works

MICRO-PROJECTORS
Bausch & Lomb Optical Co.
MICROSCOPES
Bausch & Lomb Optical Co.
Testing Machines Inc.
MOTORS
Allis-Chalmers Mfg. Co.
General Electric Co.
MOULDS
Carthage Machine Co.
International Nickel Co.
Montague Machine Co.
NAPKIN FOLDING MACHINE
Hudson Sharp Machine Co.
Paper Converting Machine Co., Inc.
Waldron, John, Corp.
OPACIFYING PIGMENT
Krebs Pigment Co.
New Jersey Zinc Co.
Titanium Pigment Co.
United Color & Pigment Co.
R. T. Vanderbilt Co.
PACKING (Rubber)
B. F. Goodrich Rubber Co.
The Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc.
U. S. Rubber Co.
PAPER BAG MACHINERY
Potdevin Machine Co.
Smith & Winchester Mfg. Co.
PAPER BREAK RECORDERS
Thwing Instrument Co.
PAPER CUTTERS
Downingtown Mfg. Co.
E. C. Atkins & Co.
Hamlet Machine Company
Moore & White Co.
Smith & Winchester Mfg. Co.
PAPER MACHINES
Downingtown Mfg. Co.
PAPER MACHINE APRONS
Goodrich Rubber Co., B. F.
PAPER MACHINE DRIVES
Downingtown Mfg. Co.
PAPER MANUFACTURERS
Hanmermill Paper Co.
West Virginia Pulp & Paper Co.
PAPER MACHINE HOODS
Ross Engineering Corp., J. O.
PAPER MACHINE SLICES
Montague Machine Co.
PAPER AND BOARD CUTTERS
Beloit Iron Works
PAPER AND PULP MACHINERY
Beloit Iron Works
Downingtown Manufacturing Co.
Farrel-Birmingham Co.
E. D. Jones & Sons Co.
Lobdell Car Wheel Co.
Moore & White Co.
Perkins & Son, Inc., B. F.
Pusey & Jones Corp.
Smith & Winchester Mfg. Co.
Valley Iron Works Co.
PAPER ROLLS
B. F. Perkins & Son, Inc.
Textile Finishing Mchy Co.
Waldron Corp., John
PAPER SCALES
Testing Machines, Inc.
Thwing Instrument Co.
PAPER STOCK WASHERS
Jones & Sons Co., E. D.
PAPER TESTERS
Perkins & Son, Inc., B. F.
Testing Machines, Inc.
Thwing Instrument Co.
Valley Iron Works Co.
PAPER TUBE MACHINERY
Dietz Machine Works
Langston Co., Samuel M.
PAPER WAXING MACHINERY
Waldron Corp., John
PASTING MACHINES
Potdevin Machine Co.
John Waldron Corp.
PENESCOPE PENETRATION TESTER
Thwing Instrument Co.
PERFORATING MACHINES
Dietz Machine Works
Waldron, John, Corp.
PERFORATED METAL
Harrington & King Perforating Co.
Hendrick Mfg. Co.
PIPE
The Reading Iron Co.
PIPE, Large O. D. (Steel or Wrought Iron)
Taylor Forge & Pipe Works

WHERE TO BUY

PIPE, Spiral (Welded or Riveted Steel)
Taylor Forge & Pipe Works
PIPE (Stainless)
International Nickel Co.
Mundt & Sons, Charles
PIPING
Crane Company
PLATING, CHROMIUM
Chromium Corp. of America
PLATERS
Perkins & Son, Inc., B. F.
PLAYING CARD MACHINERY
Waldron, John, Corp.
POWER TRANSMISSION EQUIPMENT
Chain Belt Co.
De Laval Steam Turbine Co.
Farrel-Birmingham Co.
Link-Belt Co.
T. B. Wood's Sons
Philadelphia Gear Works
PRECISION INSTRUMENTS
Cambridge Instrument Co.
The Bristol Co.
Taylor Instrument Co.
Testing Machines, Inc.
Thwing Instrument Co.
PRESSES (Napkin)
Paper Converting Machine Co.
Waldron Corp., John
PRESS ROLLS
American Wringer Co., Inc.
Beloit Iron Works
Downingtown Manufacturing
Goodrich Rubber Co.
Montague Machine Co.
The Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc.
Pusey & Jones Corp.
Valley Iron Works Co.
PRESS ROLLS (Granite)
Beloit Iron Works
Perkins & Sons, Inc., B. F.
Pusey and Jones Corp.
PRESSURE BULKER
B. F. Perkins & Son, Inc.
PRINTING MACHINES
Potdevin Machine Co.
Waldron, John, Corp.
PRINTING PRESSES
Hudson Sharp Machine Co.
Potdevin Machine Co.
Paper C onverting Machine Co., Inc.
John Waldron Corp.
PULLEYS
Chain Belt Co.
Link-Belt Co.
Improved Paper Mchy. Corp.
Montague Machine Co.
T. B. Wood's Sons
PULMAX DRIVES
Bird Machine Company
PULPERS
E. D. Jones & Sons Co.
PULP MILL EQUIPMENT (Chemical)
Carthage Machine Co.
Chemipulp Process, Inc.
PULPSTONES
Carborundum Co.
Norton Co.
PULP PRESSES
Farrel-Birmingham Co.
PULP SCREENS
E. D. Jones & Sons Co.
Trimbey Machine Works
PULP SHREDDER
Sturtevant Mill Co.
PULPS
Andersen Co. J.
Castle & Overton
Gottesman & Co., Inc.
Lagerloef Trading Co.
Perkins-Goodwin Co.
Price & Pierce, Ltd.
Pulp and Paper Trading Co.
PULP THICKENERS
Downingtown Mfg. Co.
Moore & White Co.
PULP WOOD MACHINERY
Montague Machine Co.
PUMP PRIMERS (Steam and Water Jet)
Valley Iron Works Co.
PUMPS (Acid)
Carthage Machine Co.
De Laval Steam Turbine Co.
Frederick Iron and Steel Co.
Moore & White Co.
Oliver United Filters Inc.
Pusey and Jones Corp.
Valley Iron Works
PUMPS (Centrifugal)
Allis-Chalmers Co.
Downingtown Mfg. Co.
Pusey and Jones Corp.
PUMPS (Stuff)
Allis-Chalmers Co.
Beloit Iron Works
De Laval Steam Turbine Co.
Downingtown Mfg. Co.
International Nickel Co.
Moore & White Co.
Oliver United Filters Inc.
Pusey and Jones Corp.
Smith & Winchester Mfg. Co.
Valley Iron Works Co.
PUMPS (Suction)
Moore & White Co.
PYROMETERS (Roll)
Cambridge Instrument Co.
The Bristol Co.
Thwing Instrument Co.
PYROMETERS (Surface —Optical — Radiation)
Cambridge Instrument Co.
Pyrometer Instrument Company
RAG CUTTERS
Perkins & Son, Inc., B. F.
Taylor Stiles & Co.
REAM COUNTERS
Hamblet Machine Co.
RECORDING INSTRUMENTS
Cambridge Instrument Co.
The Bristol Co.
Taylor Instrument Co.
Testing Machines, Inc.
Thwing Instrument Co.
RECORDING TACHOMETERS
The Bristol Co.
General Electric Co
Pusey & Jones Corp.
RECOVERY SYSTEMS (Soda & Sulphite)
Ross Engineering Corp., J. O.
RECOVERY SYSTEMS (Waste Heat)
Ross Engrg. Corp., J. O.
REELS
Downingtown Mfg. Co.
REELS, (Upright & Revolving)
Beloit Iron Works
De Laval Steam Turbine Co.
Moore & White Co.
Pusey & Jones Corp.
REFINERS (Centrifugal)
Bahr Bros.
REFINING ENGINES
Jones & Son Co., E. D.
REFRACTORIES
Carborundum Co.
Norton Co.
REGULATORS
The Bristol Co.
Control Equipment Corp.
Merritt Engrg. & Sales Co., Inc.
Trimbey Machine Works
REWINDERS
Beloit Iron Works
Cameron Machine Co.
Deitz Machine Works
Downingtown Mfg. Co.
Hamblet Machine Co.
Langston Co., Samuel M.
Moore & White Co.
Smith & Winchester Mfg. Co.
John Waldron Corp.
ROD MILL
Allis-Chalmers Co.
Mine & Smelter Supply Co.
ROLLS
American Wringer Co.
Downingtown Mfg. Co.
Goodrich Rubber Co.
Improved Paper Mchy. Corp.
Montague Machine Co.
Textile Finishing Machy. Co.
The Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc.
John Waldron Corp.
ROLLS (Chilled Iron & Gray Iron)
Farrel-Birmingham Co.
Improved Paper Mchy. Corp.
Lobdell Car Wheel Co.
Smith & Winchester Mfg. Co.
Valley Iron Works
ROLLS (Forged)
Kropp Forge Co.
ROLLS (Rubber or Rubber Covered)
American Wringer Co.
R. F. Goodrich Rubber Co.
Downingtown Mfg. Co.
Improved Paper Mchy. Corp.
Montague Machine Co.
The Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc.
United States Rubber Co.
ROLL GRINDERS
Farrel-Birmingham Co.
Lobdell Car Wheel Co.
ROLL SLITTING MACHINES
Cameron Machine Co.
Langston Co., Samuel M.
ROLL STANDS
Cameron Machine Co.
Moore & White Co.
ROLL WINDING MACHINES
Cameron Machine Co.
ROSIN SIZE
American Cyanamid & Chemical Corp.
Bennett, Inc.
Paper Makers Chemical Co.
ROTARY SCREENS
E. D. Jones & Sons Co.
Moore & White Co.
Valley Iron Works
RUBBER GOODS
American Wringer Co.
Goodyear Tire & Rubber Co.
B. F. Goodrich Rubber Co.
The Manhattan Rubber Mfg. Co.
United States Rubber Co.
RUBBER HOSE
B. F. Goodrich Rubber Co.
Goodyear Tire & Rubber Co.
The Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc.
United States Rubber Co.
SALT
Pennsylvania Salt Co.
SAND & POLISHING MACHINES
Carborundum Co.
Waldron, John, Corp.
SATURATING MACHINES
Moore & White Co.
Potdevin Machine Co.
Waldron, John, Corp.
SAVEALLS
Bird Machine Company
Carthage Machine Co.
De Laval Steam Turbine Co.
Downingtown Mfg. Co.
Improved Paper Mchy. Corp.
Moore & White Co.
Oliver United Filters Inc.
SAWS
E. C. Atkins & Co.
SCORE TESTERS
Thwing Instrument Co.
SCREEN DIAPHRAGMS
Goodrich Rubber Co., B. F.
SCREENS
Appleton Wire Works
Beloit Iron Works
Bird Machine Company
Carthage Machine Co.
Chain Belt Co.
Downingtown Mfg. Co.
International Wire Works
E. D. Jones & Sons Co.
Improved Paper Mchy. Corp.
Link-Belt Co.
Montague Machine Co.
Moore & White Co.
Valley Iron Works
SCREENS (Perforated Metal)
Harrington & King Perforating Co.
Charles Mundt & Sons
SCREEN PLATE
Hendrick Mfg. Co.
Improved Paper Mchy. Corp.
Union Screen Plate Co.
SEPARATORS (Centrifugal)
Bird Machine Company
SHAFTS (Forged)
Kropp Forge Co.
T. B. Wood's Sons
SHEAVES
Montague Machine Co.
SHOWER PIPES
Bird Machine Company
Downingtown Mfg. Co.
E. D. Jones & Sons Co.
Montague Machine Co.
Moore & White Co.
Smith & Winchester Mfg. Co.
SHREDDERS (Pulp and Paper)
E. D. Jones & Sons Co.
Taylor Stiles & Co.
SILICATE OF SODA
American Cyanamid & Chemical Corp.
Philadelphia Quartz Co.
SIZING
National Oil Products
SIZING PROCESS
Bennett, Inc.
National Oil Products Co.
Ross Engrg. Corp., J. O.
SLIME REMOVER
Magnus Chemical Co.
SLITTERS AND REWINDERS
Beloit Iron Works
Cameron Machine Co.
Dietz Machine Works
Downingtown Mfg. Co.
Hamblet Machine CO .
Langston Co., Samuel M.
Moore & White Co.
Pusey & Jones Corp.
Smith & Winchester Mfg. Co.
Waldron Corporation, John.
SODA ASH
American Cyanamid & Chemical Corp.
Diamond Alkali Company
Mathieson Alkali Works, Inc.
Paper Makers Chemical Corp.
Pennsylvania Salt Mfg. Co.
Solvay Sales Corp.
SOAP POWDER
Magnus Chemical Co.
Paper Makers Chemical Corp.
SORTING TABLES
Moore & White Co.
SPECIAL MACHINERY
Carthage Machine Co.
Downingtown Mfg. Co.
Farrel-Birmingham Co.
Hamblet Machine Co.
Hudson Sharp Machine Co.
Montague Machine Co.
Paper Converting Machine Co., Inc.
John Waldron Corp.
SPEED CHANGES (Variable)
Moore & White Co.
SPEED REDUCERS
Beloit Iron Works
De Laval Steam Turbine Co.
Farrel-Birmingham Co.
Link-Belt Co.
Philadelphia Gear Works
Pusey and Jones Corp.
SPIRAL BEVEL GEARS DRIVE STANDS
Beloit Iron Works
Moore & White Co.
Philadelphia Gear Works
Pusey and Jones Corp.
SPROCKETS
Chain Belt Co.
Improved Paper Mchy. Corp.
STAIR and FLOOR TILES—(Non-Slip)
Carborundum Co.
Norton Company
STAIR TREADS
American Pressed Steel Co.
Carborundum Co.
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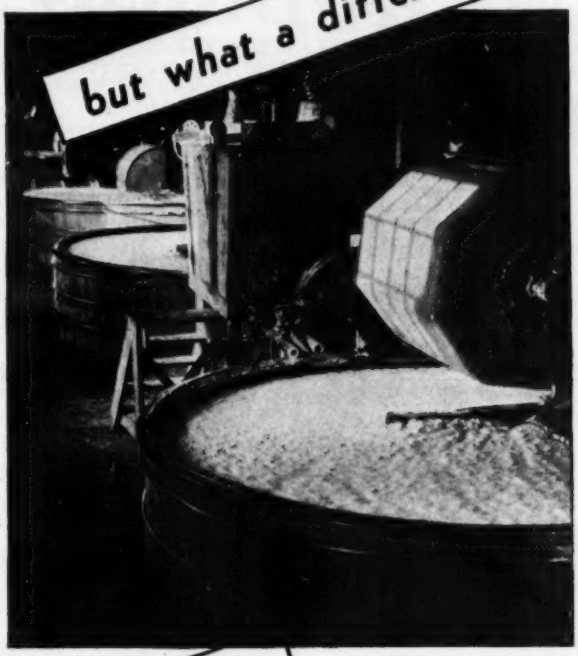

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